

Universal Cooler Answer in Option Suit Asserts Stockholders Knew of Transaction And That Directors Did Not Profit

(Concluded from Page 1, Column 3) \$250,000 was obtained early in 1934 in connection with these options and that this loan falls due on Jan. 22, 1937. Further allegations are that at the same time those named in the bill entered into a contract that provided for two options, one being for 66,180 shares of Class A stock and 206,390 shares of Class B stock, while the other was for 2,642 Class A and 17,224 Class B shares. Both options, it is alleged, ran to J. B. Ford, Jr., a director, who, it is said, assigned the right to purchase all shares covered by the primary option and half of the shares in the secondary one to Kelvinator Corp., at the same time retaining for himself one-half of the shares covered in the secondary option.

It is also alleged that stockholders, at a special meeting on Dec. 22, 1933, approved a change in the corporation's capital structure in order to aid future financing and amending the bylaws by eliminating Article 9, which related to pre-emptive rights and the power to amend bylaws.

The corporation now has 66,178 shares of Class A and 206,386 shares of B stock outstanding. If the options are exercised, it is alleged that this would increase its capitalization to 135,000 shares of A stock and 430,000 shares of B.

The various charges made in the bill of complaint, and the answers made by Universal Cooler Corp., as defendant, have been published in a booklet which the company has distributed to its stockholders for their information. Substance of the company's case is contained in the answers to several specific charges.

Allegations by the complainants that their demands for cancellation of the option contract with Kelvinator, made in a letter to Universal Cooler officers and directors on Aug. 24, 1936, were disregarded, are denied by the company in its answer.

Continuing, the company avers that when the letter containing the demands was delivered at the plant, the board of directors took action on it immediately by referring it to its counsel for reply. In a letter written by Counsel Edwin C. Lewis and delivered to plaintiffs' counsel the same afternoon, the legal basis of the contention that the option contract was unlawful was requested.

Letter Was Not Answered

The company contends that no written reply to the letter written by Mr. Lewis was received. Later telephone conversation, however, established the fact that the plaintiffs were going ahead with the suit without waiting for further communication from the defendants.

The letter sent by the complainant stockholders to Universal Cooler officers and directors referred to "a certain option contract outstanding to unknown parties." In the phone conversation, the company's answer states, the company's counsel had suggested that Kelvinator Corp. and J. B. Ford, Jr., be named and made defendants in any action brought, since the ultimate purpose was to affect contract rights held by them.

Notwithstanding having such information in their possession, the answer states, the plaintiffs neglected and refused to join the optionees as parties defendant in the case, and it became necessary for counsel for the defendants to apply to the court for an order requiring that they be made defendants, in the interest of an orderly procedure.

\$1,500,000 Order Explained

The company admits that, prior to Dec. 15, 1933, it had the opportunity of expanding its operations through the offer of an account requiring merchandise worth \$1,500,000, which required \$250,000 additional working capital.

It is denied, however, that instead of advising stockholders of the new business and the necessity of raising additional working capital to handle it in accordance with their duties as directors and existing pre-emptive rights, the company's directors evoked a plan whereby stockholders were prevented from knowing the true conditions and from acquiring additional stock.

The company was not operating successfully at the time, states the defendant's answer, and directors and shareholders who had carried the larger share of the financial burden of prior corporate financing were discouraged with the outlook, and were unwilling either to make further investment themselves, or to recommend such investment to shareholders generally.

When the opportunity for additional business occurred, it is admitted that certain details of the arrangement ultimately made, particularly concerning the identities of

parties to the pending negotiations, were withheld by officers and directors from shareholders.

Essential facts regarding the transaction, the company's answer states, were announced by it as follows:

"Shortly after the beginning of this fiscal year (Oct. 1, 1933, through Sept. 30, 1934) the company had an opportunity to expand its operations through the offer of an attractive account requiring merchandise in the amount of approximately \$1,500,000. This expansion required additional working capital, which was taken care of by the company borrowing \$250,000 for a period of three years. In connection therewith, we have an option on 68,822 shares of unissued Class 'A' stock at \$4.65 per share net and 223,614 shares of unissued Class 'B' stock at 93 cents per share net, the option expiring on Jan. 22, 1937."

In slightly different form, this information was given to shareholders in a letter accompanying the annual report for the year ending Sept. 30, 1934, the answer avers. Similar statements were also included in the auditors' letter to shareholders which accompanied the 1934 and 1935 annual reports.

'Attractive Offer' Made

The "attractive account" referred to, the company's answer states, was the account of Montgomery Ward & Co. To get this account, it became necessary to satisfy Montgomery Ward that Universal Cooler would be financially able to make delivery of such refrigerators as might be ordered.

Kelvinator Corp. became interested in assisting Universal Cooler to get this account by reason of the fact that it expected to arrange to furnish cabinets to be used in manufacturing the units for Montgomery Ward. Also, the answer states, Kelvinator owned the factory occupied by Universal Cooler, and was interested in its tenant's success.

It was learned that Kelvinator would be willing to make a term loan of \$250,000 for three years, to help Universal Cooler obtain the Montgomery Ward order, on two conditions:

1. That it be given a sufficient amount of the company's unissued stock which, if accepted, would constitute a technical majority of the issued stock of the corporation of each class then authorized.
2. That the identity of Kelvinator as a party to the transaction not be disclosed until such time as Kelvinator itself should elect to take some definite position as to whether or not it wished to avail itself of its rights under the option.

Assistance Believed Essential

Universal Cooler officers and directors, the answer states, believed that the assistance of Kelvinator Corp. was essential to the continued successful operation of the corporation, and that it was their duty to obtain this assistance. To meet the condition that the identity of Kelvinator in the transaction remain undisclosed, it was arranged that the option be taken by J. B. Ford, Jr., a shareholder and director of Universal Cooler.

The option was divided into a primary option, calling for 66,180 shares of Class "A" stock, and 206,390 shares of Class "B" stock, and a secondary option upon 2,642 shares of Class "A" stock and 17,224 shares of Class "B" stock. The secondary option was contingent upon the acceptance of the primary option, and became void if the primary option were not accepted.

Primary option was assignable only as a whole, and exercisable as a whole; the secondary option might be accepted either in whole or in part, and rights of the optionee as to all or any part of it were to be fully assignable.

Consideration for the granting of the option was the loan by the original optionee to Universal Cooler of \$250,000 upon a three-year term note, the note and option to be taken in the first instance by J. B. Ford, Jr. Negotiable funds amounting to \$250,000 were to be furnished him by Kelvinator Corp. Immediately after closing the loan and option, Mr. Ford assigned the primary option to Kelvinator and the right to take one-half the shares called for by the secondary option, retaining in himself the right to personally purchase the remaining one-half of the Class "B" shares provided by the secondary option.

The loan agreement, as negotiated with Kelvinator, provided that \$250,000 of life insurance upon G. M. Johnston, then president of Universal Cooler, be pledged as security for the loan, and that the loan become immediately due and payable in case of his death prior to its maturity date. Mr. Johnston was, however, rejected as a bad risk after having obtained \$50,000 in insurance, and the transaction was finally concluded with the

\$50,000 of life insurance as collateral. Mr. Johnston died on Jan. 17, 1935, and the proceeds of the \$50,000 insurance were collected and applied in reduction of the loan to approximately \$200,000, the company's answer states. In discussions with the company's bankers, auditors, and customers concerning the emergency caused by his death, the identity of Kelvinator as the assignee of the stock option was disclosed.

Therefore, the company asserts in its answer, Kelvinator's connection with the loan has since been a matter of common knowledge and comment in the trade and among stockbrokers and persons dealing in the company's stock, including those stockholders who are making the complaint.

Replying to charges in the complaint that the option was so arranged that one or more of Universal Cooler's directors could make a profit of several thousand shares of stock of the company, it is stated in the answer that no other director other than Mr. Ford has or had any interest, direct or otherwise, in the option as participant in any profits arising from it. No possible profit can accrue to Mr. Ford, it is further stated, excepting in the event that Kelvinator exercises its primary option, because his half of the secondary option lapses unless Kelvinator exercises its primary option.

In the event that Kelvinator's option should at some time be accepted, and Mr. Ford's right to half the shares covered by the secondary option be perfected, his course of action would have to be regulated in the light of his duty as a director and his possible accountability as a trustee for the corporation of any profit, should any at any time be received by him, the answer also states.

Stock Changes Announced

Admitting that no specific notice was given to shareholders in advance that the option was about to be executed, the company in its answer avers, however, that it was stated in the letter sent to shareholders under date of Dec. 15, 1933, that the proposed reduction of the stated value of Class "A" stock from \$10 to \$5 per share, and the changes in the respective numbers of the "A" and "B" shares, were recommended by the board of directors to bring the company's capital structure in line with the possible sale of the authorized shares of stock.

At the annual shareholders' meeting on Nov. 28, 1934, the defendants' answer continues, a statement telling of the \$1,500,000 order and the loan of \$250,000, with the option of 68,822 shares of unissued "A" stock and 223,614 shares of unissued "B" stock was read in open meeting. This was repeated in the president's letter accompanying the formal annual report and accompanied by the auditors' letter of Nov. 22, 1934.

The defendants deny the allegation in the bill of complaint that it was understood and agreed that the option should be exercised by the optionee only in the event the corporation became unable to pay the accompanying loan, and aver that no intention not to exercise the option for profit was ever communicated to the corporation or its directors by Kelvinator Corp.

The defendants also deny the conclusion in the bill of complaint that the corporation and its stockholders would be damaged to an amount of \$1,000,000, and that the optionee would profit in any corresponding sum through exercise of the option. They aver that the ultimate economic effect of the exercise of the option upon the future of the corporation and the value of its shares would be dependent upon many factors not appearing in the bill of complaint, and upon many unpredictable events.

Up to the date of the filing of their answer to the bill of complaint, defendants state that Kelvinator has not served upon Universal Cooler Corp., nor upon any of its officers or directors, any acceptance of the option. If the primary option is not exercised, they aver, the issue made in the bill of complaint will disappear, since the secondary option of J. B. Ford, Jr., will lapse automatically.

If, however, Kelvinator accepts its primary option and makes timely tender of payment for the optioned shares under the terms of the option, it is the belief of the defendants, the answer states, that Kelvinator is justly entitled to receive delivery of the shares.

S-W Convention Orders Double Last Year

CHICAGO—Definite shipping orders for its 1937 line of refrigerators received by Stewart-Warner Corp. at its recent convention, here, more than doubled orders received at last year's convention, according to Frank A. Hiter, vice president and general sales manager.

Stewart-Warner's refrigerator sales for the first nine months of this year were 105% greater than for the same period in 1935, Mr. Hiter stated.

New Trailer Refrigerator Unit Adaptable To Either Gasoline or Electric Power

(Concluded from Page 1, Column 4) tor has a starting torque of 125 watts and a running load of 100 watts.

The generator fuel tank holds two quarts of gasoline. On this fuel supply, it will run approximately six hours, which is ample time to freeze the water in the cooling unit, and to charge the batteries. When the fuel supply is exhausted, the engine naturally stops, and the circuit is automatically broken so the batteries will not drain.

Where a gasoline generator is used, the compressor is equipped with a 12-volt d.c. motor. Two 16-volt 17-plate batteries are carried in the rear of the trailer. Batteries and battery chargers are not supplied by the Aerofo company, as they are standard equipment and may be purchased to suit individual requirements.

When traveling in sections where central power is available, the generator set is not necessary, for refrigeration can be operated off existing power lines through means of a throw-over switch, batteries being charged through a small converter. If travel-

ing is to be done only in such powered regions, the compressor is equipped with a 110-volt a.c. motor.

Complete equipment weighs about 25 lbs. Copper tubing is used to connect the cooling unit to the compressor. Automatic thermostats or time-stats can be supplied if desired.

The unit retails at present for \$125 complete, except for batteries. Tentative cost to trailer manufacturers is set at \$77.60 with generator.

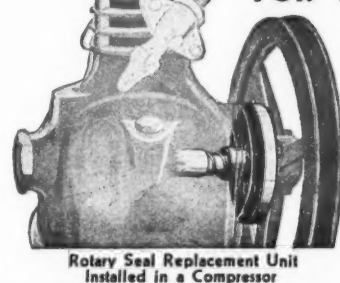
"First publicly introduced at the 'tin can' convention of trailer enthusiasts at Sandusky, Ohio, last August, approximately 16,000 orders have already been booked," Mr. Heideman claims.

"Although the unit was developed for trailer use, its flexibility and adaptability was soon discovered," Mr. Heideman said, "and soon there was a real demand for the unit anywhere that space was a prime requisite. Orders are now coming in for Aerofo units to be used in small apartments, cabin cruisers, and similar places."

The Buyer's Guide

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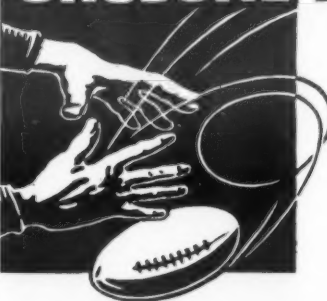
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Chicago Mart to House Displays Of Appliances

New Building Planned for Permanent Refrigeration & Conditioning Exhibits

CHICAGO—Refrigeration, air conditioning, and home appliances will be spotlighted in a permanent skyscraper exhibit here when plans of the Marshall Field estate and the National Association of Real Estate Boards are completed. This new building, to be called the National Home and Building Center, will be the first skyscraper to go up in Chicago since the beginning of the depression.

The center is to be comparable to the Merchandise and Furniture Marts. In the new building will be housed offices of concerns representing every phase of the home specialties, real estate, and construction businesses.

Education exhibits, training schools, finance companies, mortgage banks, and other businesses closely allied to the construction industry will find office space in the building.

No official announcement of the board's action has been made, but it was learned the building is to be

(Concluded on Page 2, Column 4)

Temprite Pays 50-Cent Dividend, Employee Bonus

DETROIT—Coincident with declaring its first dividend—50 cents per share on all outstanding stock—Temprite Products Corp. recently paid its employees a bonus apportioned according to salary and to years of service with the corporation.

In presenting the bonus checks, John Wylie, vice president and general manager, stated that Temprite had this year written up the biggest volume of business in its history.

Finance Men Differ as to Future Course Of Current 'Boom' in Business

CHICAGO—Divergent points of view as to the near future course of the current "little boom" were taken by leading speakers at the two-day Finance Conference, conducted at the Hotel Sherman Wednesday and Thursday. Finance companies dealing in consumer installment paper sponsored the conference.

Dr. Edwin W. Kemmerer of Princeton University predicted that interest rates were bound to rise sharply, that commodity prices will be double those of the "standard year 1926," and that the cost of living will have gone up 110% "before we realize it." He set no definite dates for these prognostications to materialize.

On the other hand, Willard L. Thorp, director of economic research for Dun & Bradstreet, warned the delegates against placing any reliance in the longevity of the "little boom." America, he averred, "is entering a period of optimistic error."

"During the early part of a strong inflationary movement, interest rates are usually temporarily depressed," explained Prof. Kemmerer.

"The market is being glutted with money and bank credit. They give the owner the right to obtain capital goods on demand. The result is that the public thinks of capital continually in terms of money, rather than in terms of goods, and it reasons that to increase the supply of money is synonymous with increasing the supply of capital."

"When the country's supply of money and bank credit and of circulating bank credit is being greatly increased under inflationary forces, interest rates are, therefore, for a period in the early stages of the inflationary process, temporarily depressed and the velocities at which money and bank deposits circulate are greatly reduced, as they are in the United States today."

"After such a period of temporary money glut and low interest rates, gradually the increased supply of money and bank credit make themselves felt in rising prices. The velocities of money and bank deposit circulation are greatly increased."

Foreign Trade Number Next Week

The Foreign Trade Number of Air Conditioning and Refrigeration News, to be published next week, will be devoted to an appraisal of the present foreign market for refrigeration and air-conditioning equipment, and the opportunities which this market presents.

The issue will contain letters from foreign distributors, giving intimate pictures of their particular problems and difficulties; interviews with foreign consuls concerning trade restrictions and the present economic status of various countries; and the latest regulations of foreign powers on American imports.

Editor George F. Taubeneck will comment on conditions as he found them on his recently completed seven months' trip around the world. Important observations on trade opportunities as seen by American consuls in foreign countries will also be reported.

Informal Talks on A.S.R.E. Program

NEW YORK CITY—Short informal talks by leaders in the refrigeration and air-conditioning field will be an added feature of the thirty-second annual meeting of the American Society of Refrigerating Engineers, to be held in Hotel Pennsylvania from Dec. 2 to 5.

A fine schedule of technical papers will be delivered at the convention, covering the latest developments in air conditioning, thermal problems, and the increasing importance of

(Concluded on Page 2, Column 3)

N. Y. Edison Co. Launches Plan To Build Sales

Utility Will Merchandise Appliances, Giving Dealers Commission

NEW YORK CITY—A new merchandising program on electrical appliances, designed to increase the use of electricity among customers of New York Edison Co. whose monthly current consumption averages less than 40 kwh., was announced last week by E. F. Jeffe, assistant vice president of the company.

In working out the plan, New York Edison will introduce some fundamental changes in its merchandising practices, Mr. Jeffe announced.

Under the new program, the company will carry appliance stocks, deliver the orders, bill, collect, and assume credit risks, at the same time allowing cooperating dealers a profit on each sale. Previously the utility had carried sample merchandise for

(Concluded on Page 2, Column 1)

Stockholders to Vote On Nash-Kelvinator Merger Dec. 23

DETROIT—A meeting of the stockholders of Kelvinator Corp. has been called for Dec. 23, for the purpose of voting on the proposed agreement of merger with Nash Motors Co.

In order for the merger to be effected, it must be approved by the holders of not less than two-thirds of the stock of each of the companies.

In a brochure calling attention of Kelvinator stockholders to the merger plan, the following are listed as the contributions which Nash Motors offers in the merger:

(1) Manufacturing facilities at Kenosha, Racine and Milwaukee for the manufacture of an unusually large proportion of the component parts of its automobiles, including its own bodies.

(2) A new and improved 1937 line of automobiles.

(3) Exceptionally strong financial position with cash and U. S. Government Securities at July 31, 1936, of more than \$25,000,000.

(4) An organization and personnel which has been built up over the last 20 years by C. W. Nash, a leader in the automotive industry, onetime president of General Motors.

(5) More than 1,400 retail dealers, and 70 distributors.

Complete Reports on Service Meetings

Detailed reports on the technical papers presented at the recent Refrigeration Service Engineers Society convention in Memphis, and photographs of exhibits of equipment, and of parts manufacturers and jobbers who attended conventions of their respective associations in Memphis, are a feature of this issue.

Following is an index to the reports of the papers:

"A New Era in Refrigeration Controls," by Dan D. Wile, Detroit Lubricator Co.—Page 9.

"How to Figure Proper Compressor Capacities for Various Applications," R. F. Polley, Mills Novelty Co.—Page 14.

"How to Figure a Specified Air Conditioning Job," A. F. Hoesel, Peerless Ice Machine Co.—Page 19.

"How to Figure a Specified Truck Installation," G. D. Wang, Copeland Refrigeration Corp.—Page 16.

"Forcedraft Unit Coolers—How to Use Them and Specific Examples of How to Figure Jobs," Joe Askin, Fedders Mfg. Co.—Page 13.

"Conversion of Flat Belt Drives to V-Belt Drives," R. E. S. Geare, L. H. Gilmer Co.—Page 10.

Wolverine Tube to Build New Offices

DETROIT—Wolverine Tube Co. will break ground Monday for a new office building adjacent to the company's plant.

The new building, a one-story structure measuring 60 by 130 feet, will be ready by about March 1.

Winfield, Kansas, Dealer Uses 'Armies' Of Youngsters to Get Prospect Leads

WINFIELD, Kans. — "Armies" of youngsters, exercising their natural competitive spirit, are being used in the latest sales promotion scheme of Maytag Electric Co., Westinghouse dealer here. And according to owner C. V. Blood, the plan is bearing excellent results.

Desiring to enlarge its user territory, the company is sending out pairs of salesmen to various small towns

54,230 Units Are Sold in 9 Mos. In Philadelphia

Average Retail Price of Household Models Drops to \$174

PHILADELPHIA—Sales of household electric refrigerators in the Philadelphia metropolitan area during the first nine months of this year totaled 54,230 units, an increase of 25% over the 43,237 sold during the same period of last year, according to figures gathered by George R. Conover, managing director of the Electrical Association of Philadelphia.

Retail value of 1936 sales for the nine-months period is \$9,436,614, an increase of 21% over the \$7,791,380 reported for a similar period last year, the report shows.

An important feature of the report is the tabulation of the average retail price for 1936 units, compared with those sold last year. The Philadelphia association is one of the few sources from which unit price figures are available.

Despite the 21% rise in retail sales value this year, unit price of the refrigerators sold dropped from \$180 in 1935 to an average of \$174 this year, the report reveals.

Philadelphia Electric Co., whose

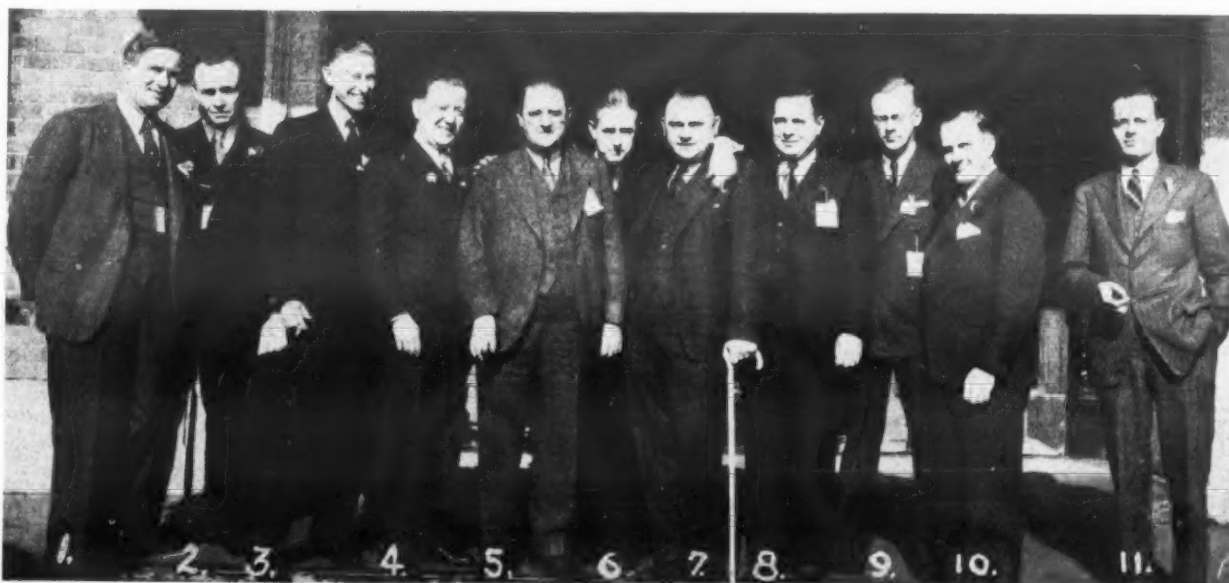
(Concluded on Page 2, Column 5)

Crosley Dividends Total \$1.25 a Share for Year

CINCINNATI — Directors of the Crosley Radio Corp. last week declared a dividend of 75 cents per share to stockholders on record at the close of business Dec. 1, payable Dec. 15. This dividend makes a total of \$1.25 per share paid by the company for the year, according to Powell Crosley, Jr., president.

(Concluded on Page 2, Column 2)

Some Leaders in Cooperative Jobber Activity



In this picture, taken at the recent convention of the Refrigeration Supply Jobbers Association at Memphis, are some of the parts wholesalers who have been very active in building a strong cooperative association. (1) U. C. Boyles of the Refrigeration Supply Co., Dallas, Texas; (2) We're not quite sure, but we believe it's Clyde B. Westbrook of the Westbrook Carburetor Electric Co., San

Antonio, Texas; (3) L. H. Roberts, Forslund Pump & Machinery Co., Kansas City; (4) Irving Alter, Harry Alter, Inc., Chicago, a director of the association; (5) H. S. McCloud, Williams & Co., Pittsburgh, retiring president of the association; (6) Frank J. Gleason of Detroit, executive secretary of the association; (7) Joe Oberc, J. M. Oberc, Inc., Detroit, a director; (8) M. W. Apple-

bee, Burstein-Applebee Co., Kansas City, secretary of the association; (9) H. W. Small, Thermal Service Co., Inc., St. Paul, who has served on many association committees; (10) J. D. Colyer, Wolverine Tube Co., Detroit, and president of the Refrigeration Supplies and Parts Manufacturers Association; (11) Arnold Dessau of Melchior, Armstrong, Dessau Co., Inc., New York.

within a 25-mile radius of the store. Armed with both red and blue Westinghouse buttons, good luck pieces, and a few \$2.50 baseball gloves, the salesmen rent an unoccupied store window. Decorating it with advertisements of their products, they install a telephone and settle down to wait.

No sooner are they established than small boys begin dropping around and asking questions—the inevitable result in a town of that size.

The approach is simple: "Hello, boys, want a button?" As they fill out a gift coupon with the name and address of their parents, and a few brief facts as to the extent and condition of such electric household appliances as the family may have, the boys are given their choice of a red or blue button.

Then they are sent out to bring in other recruits for their respective "armies." New boys come in rapid succession. It is easy for the salesmen to pick a "captain" from among the early arrivals.

The youthful armies are sent out to distribute the gift cards among the housewives of the community. These gift cards, brought to the temporary sales office by the women themselves, entitle them to a large refrigerator bottle—providing the coupon is presented before the date stamped on it.

At the end of the campaign, the armies report. All boys bringing in good live prospects are given the good luck tokens. Baseball gloves are given to those whose prospects actually buy.

While these boys are being organized and sent out, other forms of advertising are going forward. Manufacturer's folders stamped with the local distributor's name are placed in every house by a dependable high-school boy; salesmen alternate in the salesroom and in the field, covering every home.

Cost of such a campaign is slight, and results have proven very satisfactory, Mr. Blood says. Not only do immediate sales result, but contacts made in this way often develop into delayed deals which can be closed by regular salesmen at some later date.

N. Y. Edison to Give Dealers Profits on Appliance Sales

(Concluded from Page 1, Column 3)

display only, turning all orders over to dealers, who delivered, billed, and collected for those sold.

New York Edison will not re-enter the merchandising field as a full-fledged operator, Mr. Jeffe announced, but will continue to operate, as in the past three years, only through cooperating dealers.

Appliance Plans for December

Featured in the company's December drive will be four appliances: Hotpoint iron, Westinghouse toaster, Griest I. E. S. lamp, and Emerson radio. The utility is offering these appliances in two "bargain packages" during the month. First "package," containing the first three items, is being offered at \$9, with terms of 75 cents a month for 12 months; second, containing all four items, is being offered at \$18, with terms of \$1.50 a month for 12 months. Regular cost of the first "package" is said to be \$15.85; of the second, \$35.80.

Sales on the deferred payment basis will be made only to New York Edison customers and employees, Mr. Jeffe announced. Others may obtain the same price, but on a cash basis.

Stores at Each Office

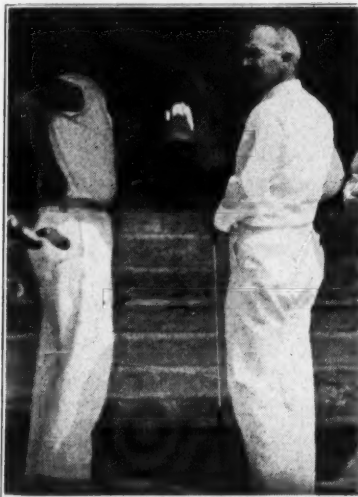
Each of the utility's business offices will carry stocks of the appliances, upon which dealers may draw if they wish to make deliveries themselves.

Backing the campaign, Mr. Jeffe said, is the largest advertising appropriation in the company's history, including newspaper space, display stands, placards, and other dealer sales helps.

In announcing the drive, Mr. Jeffe called attention to the fact that, since 1935, New York Edison, through its employees and showrooms, has produced 88,035 orders for \$4,000,000 worth of appliance business for co-operating dealers. Dealer profits on this business, Mr. Jeffe said, total more than \$1,000,000.

Mr. Jeffe also said that residential consumption in the territory served by the utility company has advanced from 35.4 kwh. in 1935 to 38.9 kwh. at the present time. Increased use of appliances, through aggressive campaigns such as the one now planned, are largely responsible for the rise, he said.

New RMA Head



J. M. Fernald, general manager of the Baker Ice Machine Co., who was recently elected president of the Refrigerating Machinery Association, is pictured here taking time out during the 1936 Baker invitation golf tournament, in which he had low gross score. The photograph was furnished by Austin Jones of the United Supply Co., Omaha refrigeration parts and supply jobber.

Crosley Gives Factory Pay Increases

(Concluded from Page 1, Column 5)

In addition, board members announced the payment of Christmas bonus checks to Crosley employees, the amount to be not less than one day's pay, nor more than a week's pay, with one day's pay for each year of employment up to five years as the basic scale. Bonus checks will be issued the day before Christmas.

Crosley will inaugurate a flat increase in its factory hourly pay rate which will amount to approximately 6% of the present payroll, the board announced. Pay increases will become effective the week beginning Nov. 30.

The Christmas bonus and the increase in factory rates, Mr. Crosley stated, will amount to approximately a quarter of a million dollars for the ensuing year.

Philadelphia Dealers Sell 54,230 Household Refrigerators in Nine Months; Average Unit Price Is \$174

Month	1936 Units Sold	1935 Units Sold	1934 Units Sold	1936 % Increase or Decrease Over 1935	1936 Retail Value	1935 Retail Value	1936 % Increase or Decrease Over 1935	1936 Average Price	1935 Average Price
January	2,532	718	1,069	+252%	\$ 456,989	\$ 137,558	+232%	\$181	\$191
February	3,657	2,634	1,329	+39%	681,667	488,499	+39%	186	185
March	7,668	6,357	3,363	+21%	1,349,089	1,115,435	+21%	176	175
April	9,870	6,652	8,290	+48%	1,718,797	1,176,966	+46%	174	177
May	9,911	7,885	8,754	+25%	1,719,936	1,390,673	+24%	173	176
June	6,641	5,936	6,738	+12%	1,108,942	1,037,659	+7%	167	175
July	6,409	6,290	4,775	+2%	1,113,894	1,147,967	-3%	174	182
August	3,951	4,035	2,683	-3%	653,911	754,558	-14%	166	187
September	3,591	2,730	1,593	+31%	653,389	542,075	+17%	176	198
Totals	54,230	43,237	38,594	+25%	\$9,436,614	\$7,791,380	+21%	\$174	\$180

4,406 Domestic Units Sold in 9 Months by Philadelphia Utility

Month	1936 Units Sold	1935 Units Sold	1934 Units Sold	1936 % Increase or Decrease Over 1935	1936 Retail Value	1935 Retail Value	1936 % Increase or Decrease Over 1935	1936 Average Price	1935 Average Price
January	81	53	117	+53%	\$ 16,718	\$ 10,923	+53%	\$206	\$206
February	160	104	103	+54%	29,623	18,383	+61%	185	176
March	372	302	231	+23%	70,191	57,386	+22%	188	190
April	810	566	726	+43%	152,348	105,182	+44%	188	186
May	867	719	795	+20%	163,008	130,465	+24%	188	181
June	768	715	589	+7%	143,474	134,389	+6%	186	188
July	625	658	554	-5%	117,088	133,640	-13%	187	195
August	426	513	353	-17%	81,241	102,322	-21%	190	199
September	297	263	184	+12%	56,933	52,649	+8%	191	200
Totals	4,406	3,893	3,652	+13%	\$ 830,624	\$ 745,340	+11%	\$189	\$192

Note: Utility sales approximate 8.1% of total sales. Report covers sales in Philadelphia, Bucks, Montgomery, Delaware, and Chester Counties. Report includes sales of the following makes: Apex, Coldspot, Crosley, Frigidaire, Copeland, G-E, Grunow, Hotpoint, Kelvinator, Leonard, Norge, Spartan, Stewart-Warner, Univerval, and Westinghouse.

Air Conditioning Holds Large Place in Program of A. S. R. E. Convention

(Concluded from Page 1, Column 2)

absorption type refrigeration.

In formal talks at convention sessions will be made by Gardner Poole of Frosted Foods, Inc., who will survey progress in the frosted foods business; L. R. Boulware of Carrier Corp., who will talk on air conditioning; and George F. Taubeneck, editor of AIR CONDITIONING AND REFRIGERATION NEWS, who will report on his recent around-the-world trip.

Howard Ketchum, expert in the new science of color engineering, will be chief speaker at the welcome luncheon on Wednesday, Dec. 2.

"Aspects of Air Conditioning" will be considered at the opening technical session at 10 a. m. on Dec. 2, at which President L. S. Morse will preside.

"Residence Cooling Investigations" will be discussed by Prof. H. J. Macintire of the University of Illinois, Urbana; "A Review of Refrigeration and Air Conditioning Codes and Standards," by Chester Lichtenberg

of General Electric Co., Fort Wayne, Ind.; and "Evaporative Cooling for Comfort" by W. L. Fleisher, New York City consulting engineer.

Thermal problems will be discussed at the afternoon sessions, at which A. R. Stevenson, Jr., will be chairman. Harvey B. Lindsay of Dry-Zero, Inc., will discuss "Moisture in Relation to Insulated Walls"; Byron E. James of York Ice Machinery Co. will speak on "A Study of Heat Transfer in Unit Refrigerant Condensers Which Use Evaporative Cooling"; and L. C. Weber of the Bureau of Standards, Washington, D. C., will discuss "Air Conditioning Applied to Lithography."

Glenn Muffly will report for the joint committee on standards, and Mr. Boulware will speak informally on air conditioning.

Thursday morning's session will be held jointly with American Society of Mechanical Engineers. President Morse will preside. Addresses include "Methods of Computing Thermal Properties of Oxygen and Nitrogen," by W. F. DeBaufre; and "Review of Psychrometric Theory and Data," by W. H. Carrier of Carrier Corp.

Afternoon session, on the "Commercial Field," will feature papers on "Brine Solutions in Truck Bodies" by O. S. McGuffey of Lansing, Mich.; "Beer Dispensing Methods," by John Wyllie of Tempre Products Corp., Detroit; and "Freon-12 Thermal Expansion Valve Requirements," by J. C. Bergdoll of York Ice Machinery Corp. Following the technical session, Mr. Poole will speak informally on frozen foods.

Final session, on Friday morning, Dec. 4, will discuss "Absorption Methods," and will have as speakers W. E. Stark of Bryant Heater Co., Cleveland, whose topic is "Silica Gel in Air Conditioning"; Glenn F. Zellhoefer of Williams Oil-O-Matic Heating Corp., Bloomington, Ill., on the subject, "Commercial Absorption System"; Dr. W. R. Hainsworth of Servel, Inc., New York City, on "Problems in Household Absorption systems"; and Dr. A. A. Berestneff, who will discuss "The Open Absorption System." Mr. Taubeneck's talk on his world travels will follow the technical session.

Permanent Exhibition Planned for Chicago

(Concluded from Page 1, Column 1)

erected in the area bounded by Wells, Franklin, Quincy, and Adams Sts.

An eight or ten-story over-all building, extending the length of the Adams St. side, with a tower of 20 or more stories is contemplated.

No estimate of the cost of building has been made as yet.

Designs for the proposed building have been completed by the architectural firm of Graham, Anderson, Probst & White, and negotiations have been opened with the Starrett Construction Co. of New York City.

Philadelphia Sales Up 25% in 9 Months

(Concluded from Page 1, Column 5)

sales for the nine months total 8.1% of all sales made, sold 4,406 units during the period, an increase of 13% over the same time last year. Just as the company's increase in sales did not equal the general rise of 25%, so also its total retail value of sales increased only 11%, compared to the 21% general rise. The utility's rise in both branches was about half of the general increase.

Average retail price of units sold by the electric company declined from \$192, the 1935 figure, to \$189 for this year, a drop considerably less than that of dealers in the metropolitan area as a whole.

September sales in the electric company's territory increased to 3,591, a gain of 31% over the 2,730 sold during the same month in 1935. Retail sales value for the month was \$653,389, an increase of 17%. Sales by the utility itself rose 12% during the month, and retail sales value 8%.

Greatest monthly increase recorded this year was in January, when a gain of 252% was shown over the same month of 1935. Actual sales reached their peak in May of this year, however, when 9,911 units were reported sold. This was a 25% increase over May of last year.



Duke Power Co. Sales Contest Sets New High Records

CHARLOTTE, N. C. — Although spring drought retarded refrigeration sales in the Carolinas, late rains improved crop prospects and stimulated a demand for appliances to such an extent that sales in a 12-week Kelvinator contest recently sponsored by the Duke Power Co. totaled 6,416 units, surpassing those of any previous similar activity, officials claim.

Selling the greatest number of units, the Winston-Salem district led the campaign and topped its division in percentage of quota. The Greenville district held second place in total sales. Leading branches in point of percentage of quota were Mooresville and Taylorsville.

Henry W. Burritt, Kelvinator's vice president in charge of sales, and M. S. Bandoli, domestic sales manager, spoke at the banquet held for the contest winners at the Robert E. Lee hotel in Winston-Salem. Duke Power's merchandise manager, John Paul Lucas, was toastmaster.

Mr. Burritt presented a group of the utility salesmen with Gruen watches, awards given in connection with the Kelvinator National Pioneer Club.

Another event in the Kelvinator drive was a trip to Virginia Beach for managers or sales managers and high salesmen of leading branches. Those who won the trip were:

T. W. Yarbrough, acting sales manager, and W. B. Howard, Winston-Salem; Chalmers Fox, Mooresville; P. T. Hawkins and V. B. Ward, Spartanburg; Vance Jones and Tom Kivette, Burlington; Manager A. N. Turner, and C. W. Smithy, Reidsville; W. N. Hipp, Hickory; P. R. Harmon, Bessemer City; manager D. W. Jones, Leaksville, E. F. Fox, Taylorsville, and W. V. Haas, Greenville.

All-Black Gas Kitchen Gives Unusual Effect

CORTLAND, N. Y.—Veering from the conventional, but creating an attractive and unusual color scheme is the all-black kitchen recently installed in the home of Lee Crumb by the local office of New York State Electric & Gas Corp.

The house is completely gas equipped—house heating, water heating cooking and refrigeration. Servel Electrolux refrigerator and a Universal range both have black enamel finish.

Table tops, work and splashboards are made of black formica. Inside finish of the drawers and cupboards is done in red to present a contrast. Indirect "Lumline" lamps are used throughout the kitchen, except for the two small lights over the breakfast nook. Drape shields over the windows are of imported Belgian black opal glass.

Visitors have come from as far as Syracuse, 35 miles from Cortland, to inspect the new kitchen.

Cooper-Louisville Co. Makes Staff Changes

LOUISVILLE—S. J. Rapier, president of Cooper-Louisville Co., local Crosley distributor, recently announced several changes in the company's sales organization.

D. T. Kennelly now heads the sale of Xervacs, Crosley hair growing machine. Koldrink bottle coolers are also handled by a separate sales division, four full-time salesmen working on this single appliance.

Charles F. Lister has been added to the sales staff to aid in handling the increasing volume of business.

Not only is actual sales volume increasing, Mr. Rapier says, but collections are better than they have been for years.

Utility's G-E Display Outstanding at Show

HARRISBURG, Pa.—Pennsylvania Power & Light Co.'s display of General Electric refrigerators, and C. H. Hershock's exhibition of the Refrigerola, a portable refrigerator, were outstanding among refrigeration exhibits at the Second Annual Harrisburg Progress Exposition recently sponsored by The Patriot and The Evening News.

Crosby Bros. Name New Dealer in Topeka

TOPEKA, Kan.—Appointment of Kella Electric Co. as the fourth General Electric refrigerator dealer in Topeka recently was announced by W. A. Gregory, manager of the General Electric department of Crosby Bros. Swan Electric Co. and Miner Electric Co. are other G-E dealers in this city.



A Merchandising Riddle

"A" handles a refrigerator which lists for \$135.

"B" also handles a \$135 refrigerator. They are competitors.

"A" slyly reduces the price to \$125 to get a selling advantage over "B". Then "B" reduces his price to \$125 to stay on even terms with "A". Which one benefits?

Answer: Neither one.



This answer is not based on theorem or postulate. It is the obvious answer to experience. If you are clever you can figure it out in your head. But then you would think that all dealers could figure it out, too. Obviously some of them don't. For price cutting has always been with us. It is a frantic sort of way to do business. It can't last, because the result is a loss in profit for the dealer. And he needs all the profit that has been established in computing the selling price.

If dealers who are tempted by price cutting would realize the far better method of selling quality rather than price, everybody would be ahead. For instance, the dealer who is fortunate enough to be handling a refrigerator with Dry-Zero Insulation will be able to use this as a selling point to completely offset the cut-price argument of a competitor whose refrigerator does not have Dry-Zero Insulation.

Dry-Zero Insulation in a refrigerator will save 20c to \$2.00 per month in cost of operation for the whole life of the refrigerator. This is because Dry-Zero Insulation is the most efficient available and maintains this efficiency indefinitely. It is unique in this respect because unaffected by the moisture that inevitably penetrates into the wall of any refrigerator in use.

If you do not have this complete story, write for copies of the interesting folder, "How Dry-Zero Insulation in your refrigerator saves you money every month in cost of operation."

Dry-Zero Corporation, 222 North Bank Drive, Chicago, or 687 Broadview Ave., Toronto, Ontario.



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A Frigidaire Dealer Looks into the Future

Leo Roberts Has His Doubts about the Replacement Market but Sees Big Profits for the Dealer in Room Cooler Business

By Leo Roberts, European Radio Co., Inc., Brooklyn, N. Y.

TODAY with so much being published about the past records of the refrigeration industry, it might not be amiss to project our minds into the realm of tomorrow so that we might catch a glimpse of the many forces ahead that will vitally affect the refrigeration business of the future.

To predict future events however, is not as simple as to review the past. What has happened in the past is established fact, but to attempt to foresee what may happen in the unborn future is a task that makes forecasting an extremely difficult business. Yet if we are to successfully cope with the problems that will affect our future welfare, it becomes necessary to illuminate the way with our foresight.

I hope that by focusing attention on the serious problems that must eventually confront us, our industry leaders might be stimulated to study and to devise intelligent solutions to them. It is in this connection that I should like to present my prediction of what the future holds for the dealer group as a whole.

Let us first consider the coming building boom. From present indications, the construction of new homes, apartment houses and developments should absorb many millions of automatic refrigerators. However, it is safe to say that in the majority of such buildings, refrigeration will be supplied by the builders, who in turn will be supplied by the apartment house divisions of the various manufacturers and distributors.

Four Factors Augur Success For Industry as a Whole

At the present time, I can see ahead of us four separate and distinct forces that will bring brilliant success to the industry as a whole.

They are: the construction of new homes, the development of our foreign markets, the saturation of our present unsold market, and the coming replacement market. Let us analyze each of these forces and see

just how each one will exert a powerful influence in shaping the course of refrigeration's future.

Let us first consider the coming building boom. From present indications, the construction of new homes, apartment houses and developments should absorb many millions of automatic refrigerators. However, it is safe to say that in the majority of such buildings, refrigeration will be supplied by the builders, who in turn will be supplied by the apartment house divisions of the various manufacturers and distributors.

Although the construction of new homes will be a veritable flywheel for the manufacturers' machines, enabling them to continue spinning for many years to come, we must recognize the fact that this potentially golden market, though a blessing to the manufacturer, can never be a source of profit to the dealer.

The foreign market is the next force that will keep our factories humming for a long time. Recent reciprocal trade agreements, together with the trend towards international currency stabilization, should accelerate this

force to such a degree that within 10 years, our export business should absorb a sizable share of our total output. Yet here again, we must conclude that the domestic dealer will have to reconcile himself to the loss of a rich and virgin market.

Within the next decade, I believe that the unsold portions of our present domestic market will be saturated for all practical purposes. This is one of the forces that can yield profit for the dealer provided the price cutting problem can be brought under control.

Of course we must realize that the effective balance of our unsold market is comprised chiefly, with minor exceptions, of the lower income brackets. Only those stores catering to that market can hope to secure any volume of business from it; and for that reason the better type of outlet may have to organize field salesmen or buy up low price specials to get their share from this low income market. If the number of dealers is not increased to a point of over-diluting the total volume, the saturation of our present unsold market should be profitable to the average dealer.

Trade-In Problem Mars Replacement Field

And now, we come to the fourth and the most interesting force that will permanently alter the course of refrigeration in the future, the replacement business.

It is interesting because it involves the intricate and tricky problem of trade-in allowances. To better understand the operation of the replacement business, let us divide our present user market into two parts; those with models bought prior to 1930, and those with models bought between the years of 1930 and 1936.

With increasing purchasing power and general business pick up already in progress, it seems likely that next year will mark the official beginning of a real replacement wave. It is safe to predict that starting with 1937, all models bought prior to 1930 will be traded in within a five year period, and that most models bought between 1930 and 1936 will be traded in by 1947.

However, it has been conclusively demonstrated that when a user wants to trade in his \$200 or \$300 refrigerator, he will spurn \$10 allowances and will start shopping until he finds a dealer who, rather than lose the deal, will pad the allowance from his own profit.

Unless the industry formulates some very definite trade-in allowance policy in the near future, there will be inaugurated a reign of intensive price cutting unprecedented in the history of refrigeration.

Refrigeration Won't Follow Auto Industry's Course

There is another angle to the replacement business that may be a startling revelation to many a dealer, but it is an angle, nevertheless, that I believe will change the whole complexion of the business in the years to come.

Many dealers are convinced of a parallel existing between the replacement factor of the automobile and that of the refrigerator. They feel that refrigerators are also endowed with the promise of a short span of life. They point to the veteran models of the '27 and '28 refrigerators that have already been traded in this year and they claim that 10 years hence, the 1936 models will be traded in.

And so, convinced of the similarity between the cycles of refrigerator and automobile, they look forward serenely to the coming years, confident of a continuous flow of business. Unfortunately, this will never be so.

Refrigerators are not as consumable as automobiles and indeed, they must be considered as semi-permanent articles, at least those bought since 1936. Based upon what I know and what I have seen, I believe that the 1936 models of the eight leading makes will not be traded in for another 18 to 25 years. Let me present a few facts to substantiate my prediction.

First let us consider the high degree of efficiency of the 1936 models. Since 1926 the keen competition between the various manufacturers has accelerated mechanical design and efficiency years ahead of normal. Large engineering staffs pitted against each other, have through concentrated effort and research, compressed into one year the progress of five.

For example, look at the meter miser of Frigidaire; here you have the ultimate form of mechanism from the standpoint of efficiency, compactness, and design.

It might be argued here that the use of the word ultimate is unwarranted, what with research engineers working night and day seeking improvements. But any engineer will testify to the fact that many products, after once attaining a certain degree of efficiency, will lend themselves to refinements but not to radical changes. A classical example is the highly efficient precision watch which has been refined and simplified during the

years but not radically transformed.

Therefore I believe that unless a revolutionary method of producing refrigeration is discovered, the meter miser will represent the ultimate form of refrigeration mechanism.

Although the user of a 1927 model may be forced against his will to trade in his grossly inefficient, noisy, and chronically troublesome bulk of a refrigerator, the user of a 1936 highly developed model, with a compact mechanism that can easily and inexpensively be replaced at the end of 10 years, certainly won't be ready to trade it in, even though the 1946 models may make his model look a bit old fashioned.

This brings me to my second reason for believing that the obsolescence factor of refrigerators will not parallel that of automobiles. Although the obsolescence factor is religion to the automobile industry, it just won't work in the refrigeration business.

Making a user dissatisfied with his present car by making the new cars so much better may sell new cars, but that principle just won't sell new refrigerators. That is a bitter pill that may be difficult for dealers and manufacturers to take, but it is the truth and it is a factor that will create a turning point in the industry.

To understand the reason for the failure of the factor of obsolescence to register effectively in a refrigerator, we must analyze the product itself and the buying habits that are involved in its purchase. Without going into the intricate patterns of buying motives, let me emphasize the fact that a consumer's dollar is greatly influenced by his heart, his emotions, his feelings. Compared to the emotion-wrangling appeal of the dynamic automobile, an ice box in any shape, form or manner, is quite a prosaic, unemotional thing. After all, to the public an electric refrigerator is an automatic and highly efficient ice box; and because of this dull, static nature of an electric refrigerator, it will be tolerated even to a point where it degenerates to a degree of obsolescence that would have rated three trade-ins, in an automobile.

Now this is not far-fetched theory, but rather fundamental and unalterable fact. After having spent thousands upon thousands of hours with prospects of every description, I am firmly convinced of the above. I have seen people spend \$800 for a car and yet tolerate an old, sickly looking ice box that was on the verge of collapse. I have seen people continue to use broken down and noisy refrigerators of the bojac and jillory variety,

even though their compressors hammered away like a steam engine.

There is no question in my mind but that this consumer tolerance towards an inefficient refrigerator is its curse whereas the lack of it towards an automobile is the latter's blessing.

This anticipated increase in life expectancy of the modern refrigerator should lead to a definite decline in domestic dealers' sales by, let us say, 1942; and since building and export booms can be dismissed as outside his area, from the dealer's standpoint, the replacement problem is the most vital to his welfare.

The attendant problem of trade-ins renders the task of solution more difficult, but the problem is at our door and it must be solved if the dealer is to survive.

Greater Future Profit Lies in Room Coolers

In predicting the future of the dealer in the refrigeration business, I feel that we must include a product that should add a lot of brightness to the picture.

That product is the room cooler. Somehow, I have an intuition that in the very near future, one of the larger manufacturers is going to produce a compact room cooler with a meter-miser-like mechanism that will sell for under \$200, and when that day comes, the room cooler market should crack wide open. The refrigerator dealers will then see a demand for this equipment that will dwarf anything that they have seen in the past.

Although it has taken commercial air conditioning many years to lay the foundation for the home and office division, when the latter starts soaring, it will rear up as a new giant industry. The unit volume and velocity of this business will overshadow the former by far.

Air conditioning has sales appeal to the 'nth degree and when people can buy a product that will enable them to escape the torturous hell of a suffocating heat, and that product is small and compact, and within the financial reach of the average man, watch that product skyrocket in sales!

I have been in hospitals where human lives have actually been saved by expensive air-conditioning equipment. Imagine when this life saver will be compressed into a small inexpensive package!

If my intuition is correct, the room-cooler branch of air conditioning should very shortly bring new prosperity to the refrigerator dealers.

Patents No.
2,025,973
1,850,019

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3. VIBRATION PROOF...sealed connections cannot leak refrigeration gas.

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The Arco pure wrought copper-to-copper connection is proof against leakage, vibration, strain and pressure.

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Air Conditioning NEWS

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General Electric Company.
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J. O. Ross Engineering Corp.
New York, N. Y.

The Cooling & Air Conditioning Corp.
Division of B. F. Sturtevant Company
Hyde Park, Boston, Mass.

York Ice Machinery Corp.
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Announcing that the
FRICK COMPANY
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has become a Licensee of this Corporation with the right to install Central Station Air Conditioning Systems or to grant permission to others to do so. By becoming a Licensee it has recognized the validity of all of the Auditorium Patents and may utilize all or any of the inventions therein.

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Commercial Uses

Birmingham Dealers Report Best Com'l Sales in Years

BIRMINGHAM, Ala.—Commercial refrigeration dealers in and around Birmingham are experiencing their best season in several years, according to reports made by them to Birmingham Electric Co.

Sales during the first seven months of the year totaled 311 units, worth \$100,000, exceeding by a considerable margin the 300 units with a dollar volume of \$75,000 which, the company had estimated, sales for the entire year would total.

Present indications are that sales will run 200% ahead of last year.

Although the utility makes no sales itself, it employs a commercial refrigeration engineer who cooperates with the dealers. Approximately 90% of the commercial sales have been to grocery stores, mostly replacements.

With the legalization of beer in Alabama, the eating and drinking places are expected to be the best commercial customers in 1937. Sales to schools and hospitals also have been good.

The market for water coolers, as yet hardly touched, is beginning to open up in the south, dealers say.

Among the dealers who are profiting from commercial refrigeration sales is the Lancaster Store Equipment Co., McCray distributor in northern Alabama, which has completed 60 sales in seven months.

Clyde L. Lancaster, proprietor of the company, considers the best sales argument for commercial refrigeration that it will pay for itself. He also takes his prospects to interview satisfied customers who testify that refrigeration prevents shrinkage, and that the showcases sell more goods.

In business for only six months, Simpson & Bennett, distributor of Gill cases and Carrier and Brunswick machines, has led the field in sales for the past 60 to 90 days.

Flint Refrigeration Co., Frigidaire distributor, and Smith & Berry, also have reported numerous sales.

Commercial Box in 2 Sizes Built by Dayton

BUFFALO—A new Dayton commercial electric refrigerator, built in 15 and 20-cu. ft. sizes, and complete with 1/4-hp. condensing unit ready to plug in for use in small restaurants, taverns, roadside stands, delicatessens, and grocery stores has just been introduced by Heinz & Munschauer here.

The unit is refrigerated by means of a Fedders non-frost shallow fin, located behind a baffle in the upper part of the food compartment. The coils are equipped with Fedders Model 33 expansion valves. A two-cylinder compressor, using methyl chloride, is standard equipment.

The Dayton condensing unit is equipped with a Fedders continuous tube condenser.

Humidity in the refrigerators is high enough, it is claimed, for users to keep cold cuts, cheese, salads, and other food products unwrapped for a considerable period of time without their drying out or discoloring.

Colvin-Templeton Installs Multiple Jobs

SAN FRANCISCO—Colvin-Templeton Co., local Westinghouse distributor, recently completed several large commercial refrigeration installations.

In Bradley's saloon, Westinghouse provided refrigeration for an 8 by 18 by 8 ft. walk-in cooler, a 6 by 2 1/2 by 6 ft. box, and coils for eight beer dispensing units.

In the Tunnel Market here, Westinghouse-refrigerated walk-in boxes are used to prevent loss from shrinkage. "The Shop Easy Food Market" employs Westinghouse refrigeration for four walk-in boxes, display cases, and a refrigerated display window.

Still another installation was made in Schubert's Bakery, where refrigeration is used to preserve the yeast, butter, fillings, and fresh dough.

Kold-Hold Units Used in 2-Temperature Truck

KITCHENER, Ont.—Two model H-6113 Kold-Hold units and a 1-hp. Frigidaire condensing unit refrigerate the meat truck operated by J. M. Schneider, Ltd., here, maintaining a temperature of 50° F. in the rear compartment and 40° F. in the front compartment of the truck.

Super-Cold Reports Large Sales, Decline in Service

LOS ANGELES—October production figures in the plant of Super-Cold Corp. here were 310% higher than those for the same month a year ago, according to Superintendent Mulligan. In the same period, service calls on the West Coast have been reduced 80%.

Forced-Draft Unit Keeps Berries Fresh on Trip

DALLAS—A 22-ft. refrigerated trailer carried strawberries from the Florida and Louisiana fields to Texas markets throughout the 1936 season.

The truck body, built by American Body & Equipment Co. of Dallas for Ben E. Keith Co., is mounted on a Trailmobile semi-trailer, insulated with 6 in. of Dry-Zero in roof, 4 in. in walls, and 4 in. of cork in the floor.

Refrigeration equipment consists of a 1,500-watt Whitaker-Upp power system, a 1 1/2-hp. York Freon condensing unit, and a Kelvinator forced-convection cooling unit, which employs equalizing ducts in the roof to circulate the cooled air through the load.

Servel Distributor Finds Dairy Field Profitable

SPRINGFIELD, Mass.—Dairy operators are becoming an increasingly profitable market for commercial refrigeration in this territory, relates H. C. Lambert, Servel distributor here.

Mr. Lambert recently installed a 2-hp. Servel unit for a 12x12x10 ft. dairy box to take care of a tabular cooler in a 600-gal. pasteurized plant.

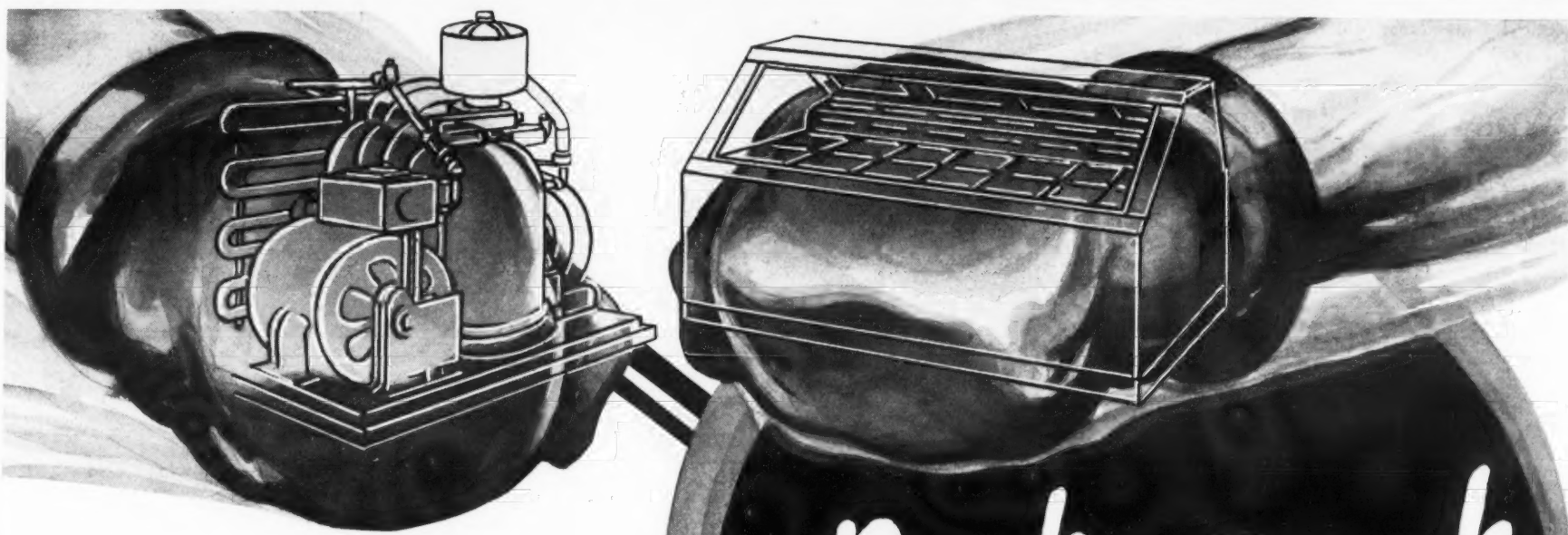
Similar installations have been made during the last few months for the Bolles Farm at Wilbraham, Mass.; the Cloverleaf Dairy in Southbridge; and the Sawyer Dairy in Dalton, Mass.

It has been estimated that 38% of the farmers' income in the Connecticut River valley is derived from milk.

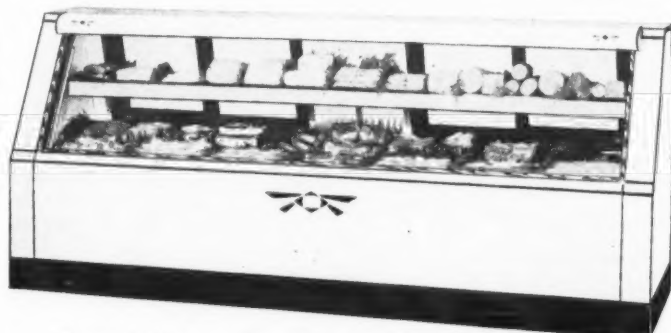
Dealer Finds Variety of Water Cooler Prospects

HUNTINGTON, W. Va.—Concentration of sales efforts on its line of water coolers has resulted in numerous installations for Van Zandt Supply Co., local distributor of Westinghouse commercial refrigeration.

One of the company's outstanding industrial installations this year was in the Carbide and Carbon Chemical plant. Another was made in Galigher Motor Sales Co., a Westinghouse FWP-8 Cooler in the salesroom with a remote outlet in the garage at the rear of the building. The Huntington Publishing Co. and United Fuel Gas Co. are other concerns to whom Van Zandt Co. has sold water coolers.

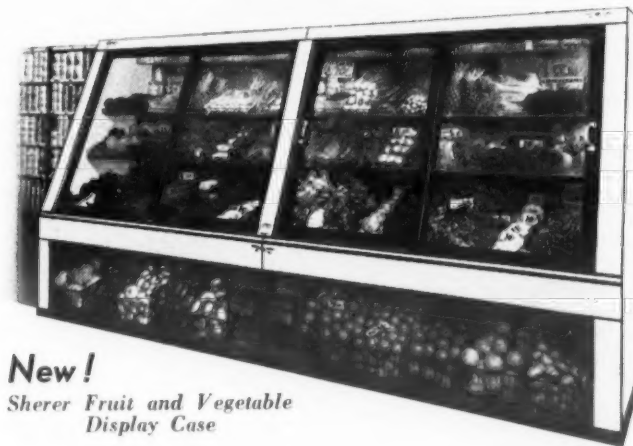
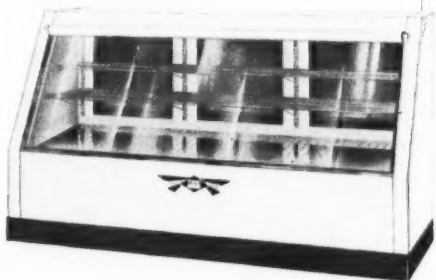


A FEW REPRESENTATIVE SHERER CASES

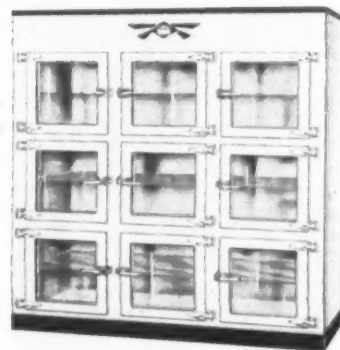


Sherer 1000 Type Two Shelf Double Duty Display Case

Sherer 5500 Type Delicatessen Case



New!
Sherer Fruit and Vegetable Display Case



Reach-in Boxes for Groceries, Restaurants and Institutions

LEADING with a strong left is mighty important in the ring—but it doesn't mean very much if there isn't a good right to follow up for the knockout!

So it is with your retail food store installations in 1937. You may have a strong line of refrigeration units for the retail food outlets—a line that you have great confidence in—but it doesn't mean nearly as much if you haven't a powerful line of food store equipment to sell along with it! That's your problem in 1937, and the Sherer Franchise for cases and coolers will solve it for you!

Put over the "knockout" blow on retail food store sales with the Sherer Franchise! You will be in the enviable position of being able to offer a complete service to the food merchant—with a line equal in quality and profit possibilities to your refrigeration unit sales. The complete installation and the double profit will be yours.

YOU CAN DEPEND ON SHERER EQUIPMENT

You must be able to depend upon the equipment in which your refrigeration unit will be used—or you will not be able to guarantee PERFORMANCE! Make this Guarantee and live up to it by completing your sales with SHERER equipment. It is engineered to do a better job!

THE SHERER LINE IS COMPLETE

The Sherer Line consists of a complete variety of refrigerator equipment in all the various sizes. Each type designed for a particular need in food stores. New equipment under development constantly opens up new channels of sales and increased profits!

The SHERER FRANCHISE SHOULD BE YOURS

In this limited space we cannot hope to tell you all the many advantages of the Sherer Franchise. We would like to tell you the entire story. Let us know which territory interests you . . . the e are still some very fine franchise territories available. Write or wire today!

A complete line of Sherer Market Coolers is also available as part of the Sherer Franchise.

SHERER-GILLETT COMPANY

M A R S H A L L , M I C H I G A N

EXCLUSIVE CASE AND COOLER MANUFACTURERS

SERVING FOOD RETAILERS SINCE 1852

SHERER
DISPLAY AND STORAGE EQUIPMENT
FOR RETAIL FOOD STORES
SHERER-GILLETT CO.
MARSHALL, MICHIGAN

Italian People at Work or Play Are Never Dull, Ever Colorful



1. "Funiculi, funicula," or maybe it's "O Sole Mio" that these Italian villagers are so merrily singing to the accompaniment of Pietro's accordion. 2. Portion of the King Victor Emmanuel Memorial in Rome, which Editor Taubeneck thinks is the most magnificent monument of modern times. 3. Italian peasants gleaning a field for herbs and roots. 4. Soldiers, soldiers everywhere in Rome, and how they do dress up! The Italian military presents a spectacular appearance at all times, which is part of Mussolini's psychology.

Around the World

With George F. Taubeneck

Refrigeration and politics in Italy are the topics of discussion in this, the 48th presentation of Editor Taubeneck's "World Series" travelogue.

Because of Mussolini's determination to make Italy as nearly self-sustaining as possible, it is extremely difficult for American refrigeration and air-conditioning equipment to gain entrance into the country. As was told in last week's instalment, a separate permit must be obtained for each piece of equipment imported, and these permits may be had only through Pull, Prayer, and Payment.

Most Italian refrigeration manufacturers are small-shop assemblers. A few, however, are substantial concerns; and these are described this week, along with a few facts about the Italian state.

Fantini

With a 30-year record in the manufacture of electrical apparatus for all kinds of industrial purposes, Alberto Fantini & Co. of Milan now makes a line of automatic switches, controls, feeders, and valves for refrigerating units and oil burners.

BRUNO FANTINI, son of the founder, has recently been engaged in translating K. M. Newcum's MASTER SERVICE MANUAL into his native tongue with the view of making it available later for use by Italian refrigeration service engineers.

The Fantini concern employs about 60 workmen in its plant with a clerical force of a dozen. Members of the Fantini family assumed control of its operations after the death of Alberto Fantini, its founder.

Although most sales are made through correspondence, the company keeps two traveling salesmen on the road doing contact work. Solicitation of sales by anything approaching specialty methods is almost unknown to the firm, Bruno Fantini says.

The company's engineering department, headed by the son, designs all products for the Italian market. Efforts are being made, however, to interest American refrigeration firms in using facilities of the Fantini company to manufacture their products in its factory.

According to Bruno Fantini, about half of the refrigeration units sold in Italy are manufactured by Italian firms. He estimates that 4,500 commercial machines in the fractional and small horsepower ranges are sold annually. Domestic sales, he says, total only about 1,000 per year, the average base price of \$250 being above the purchasing range of the majority of Italian families.

Jucker

A Milan parts firm, Giacomo Jucker & Co., employs a special manufacturing department and sales staff and keeps on hand a large stock of parts and accessories for the Italian trade.

The Jucker company does most of its importing of parts from American supply houses, and also obtains some of its products from England and Switzerland. It acts as agent for the British Thermostat Co. valves, pressure switches, and thermostats, are imported, with metal forging operations and manufacture of certain types of thermostats and electric switches being done in the home plant.

Two years ago a Jucker engineer (Dr. Marzorati) spent six months in this country observing American manufacturing processes and contacting refrigeration firms with which his company does business. At the present time Jucker serves the whole of Italy.

Giacomo Jucker is president of the firm, with Alberto Saibene acting as managing director.

Radaelli

R. Radaelli & Co., Milan, manufactures its own line of household refrigerators under the trade name "Algidus" in a factory employing 600 workers. This line has been made by the company for the past nine years. Besides refrigerators, the firm manufactures gas meters, bath heaters, chromium plated taps, and stamped iron cabinets.

"Algidus" units are manufactured entirely in the company's plant with the exception of the motor, which is a Leland (Leland Electric Co., Dayton) and Ranco thermostats. Radaelli's Leland motors are made in Italy, under patents held by the American

company, by Brown-Boveri, the licensees.

P. P. R. RADAELLI of the company reports that the Italian domestic market is heavily subnormal considering the hotness of the climate. He estimates that 3,000 domestic units are sold each year, and reports that his firm made 1,000 units last year, with bright prospects for 1937.

The company's new line will include streamlined models using a new type of highly finished hardware.

Mr. Radaelli says that he expects the importation of American units to decrease next year, due to the present unfavorable rate of exchange, which recently dropped from 13 lira to 19 lira to the dollar.

Five household units and one commercial box are included in the Radaelli line.

The domestic units have capacities of 70, 100, 140, 220, and 350 litres, and the commercial unit a capacity of 510 litres, net storage space. In styling the units are similar to American models of a year or so ago—with broom high legs, bottom-mounted condensing unit, and the ice cube chamber against the upper right wall, except in the largest model, in which it is against the left wall of the two-door cabinet.

Dell'Orto

One of the largest Italian refrigeration firms is G. Dell'Orto & Co., makers of the "Ortofrigor" line, with extensive factories at Milan. Both domestic models and industrial coolers are made by the firm, together with parts and fittings. The company was established in 1901. GIUSEPPE DELL'ORTO is president.

Vertical ammonia compressors are among the chief products of the Dell'Orto Company, ranging in capacities from 10,000 to 250,000 h./frig. Another well-known "Ortofrigor" product is a double-acting ammonia compressor, with capacities from 60,000 to 500,000 h./frig. for each cylinder.

Other products made by the firm are condensers and evaporators for replacement and other installations. Small automatic cooling assemblies with an output of from 150 to 15,000 h./frig., using sulphur dioxide, methyl chloride, and Freon refrigerants, are manufactured in greater numbers by Dell'Orto than any other firm in Italy.

All automatic devices used in the line are imported from the United States, with especial preference given to Fedders thermostatic valves.

Special branch of the company is maintained for cabinet construction, where joinery and brass work operations are taken care of in the making of ice cream counters, cooling cabinets, doors, etc.

Dell'Orto is also engaged in the air-conditioning field, having just completed making air-conditioning apparatus with Freon compressors for the new aerodynamic trains on the Italian State Railways and for Fascist submarines patrolling tropical seas.

Mr. Dell'Orto's home has also been air conditioned with Freon equipment.

During the recent war in Ethiopia, "Ortofrigor" cooling units powered by combustion engines went along with Italian troops into the most torrid parts of Ethiopia in the campaign against Haile Selassie.

The company claims the distinction of being the oldest as well as the largest refrigeration plant in Italy, and manufactures all types of cooling plants with the single exception of carbonic acid machines.

Sales policy, according to the president, has resulted in the country being divided into various zones, each in charge of a sole agent who appoints sub-agents. Certain good sales producers receive a percentage commission on sales volume over a certain figure besides regular commissions.

A few years ago, "Ortofrigor" units were exported to France, Spain, the Blacanic Peninsula, and other points, but recent trade restrictions have hit the trade considerably. Mr. Dell'Orto anticipates a good business in the future and a growing export trade.

'L'Etat, C'est Moi'

If the average American were asked to give a list of persons prominent in the Italian Government he would probably run up a total of two. Mussolini and King Victor Emmanuel III would be the list.

It is probable also that this same American, if asked what he knew about the Italian Government, would reply, "Well, Mussolini runs it." It is true that Mussolini has his finger in almost every departmental pie. But there is a government, and it does function.

Italy is classed as a constitutional monarchy. The king is the head of the State, and as such he has administrative, legislative and jurisdictional powers.

He appoints Senators, orders elections for the Chamber of Deputies, summons the two bodies to convene, dissolves the lower house, represents Italy in international affairs and relations, and has the right to declare war and make treaties of peace, alliance, and commerce. In fact, all powers converge in the person of the King, who represents the unity of the State.

From this list one would assume that the King of Italy is indeed ruler of his country. But these powers of his are for the most part purely nominal. Almost every official act of his follows the suggestion of Mussolini.

It is not the king who rules Italy. The National Fascist Party, of which Signor Mussolini is Duce, controls the country. In brief, Mussolini is it.

Fascist Movement

The Fascist movement, which had its origins prior to the World War, did not assume any degree of importance until 1919. In that year began the Fascist political revolution which

culminated in the March on Rome, October 28, 1922. Upon the success of this bold move the Grand Council of Fascism was formed, Mussolini became Head of the Government, and a new era in the long and colorful history of Italy was inaugurated.

Italian Fascism upholds the principles of Sovereignty of the State and subordination of individual interest. It does not, however, aim to break down class divisions. On the contrary, it strives to bring closer cooperation between classes.

Benito Mussolini is "Head of the Government." Under him in rank are the Secretary of State and the Ministers of the various State departments. The Head of the Government, known also as Prime Minister, is appointed by and deprived of office by the king. In other words, Victor Emmanuel has the authority to oust Mussolini.

The ministers also are appointed and dismissed by the king, but on proposal of the Head of the Government. Each minister is assisted by one or more under-secretaries who receive office in the same manner as the minister, plus the latter's approval.

The Italian Parliament consists of two houses, the Senate and the Chamber of Deputies. Members of the Senate are appointed by royal decree on the proposal of the Head of the Government. Their number is variable.

The Chamber of Deputies is made up of four hundred members chosen from a list made up by the Grand Council of Fascism. The electors of the nation then have the privilege of voting in favor of or against the list of candidates as a whole. In the case of disapproval the process is repeated and another election held.

Parliament shares the legislative power with the king.

The Grand Council of Fascism was recognized as a constitutional organ of the State by the law of Dec. 9, 1928. It is composed of the Head of the Government, and others too numerous to mention but not too numerous to make any difference. Say that Mussolini runs it, and you have said all.

In addition to deciding on candidates for the Chamber, the Grand Council directs party organization and promotion, and acts as consulting attorney in the drafting of all laws of a constitutional character.

Mechanics of State

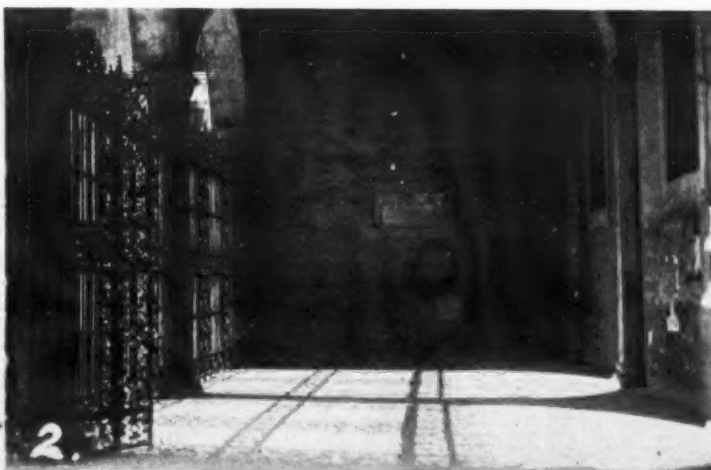
Italy is divided into 92 provinces, at the head of each of which is a Prefect who represents the executive power in the entire district. He is under the direct dependence of the minister of the interior.

Under direct dependence of the Prefect is the Podesta, entrusted with the communal administration. He is appointed by royal decree for a term of five years.

Special conditions exist in Rome, where the commune is under the administration of a governor.

"Ordinary" jurisdiction in Italy is administered by the conciliation and (Concluded on Page 8, Column 1)

'The Grandeur That Was Rome' Is Still in Use Today



1. The famous Appian Way, over which conquering generals rode into Rome in triumph 2,000 years ago, and which is still a fine road in any language. 2. Lights and shadows in the entrance of the Roman catacombs. 3. An old Roman road, still well preserved, leading through olive and vineyard districts.



Gentlemen: Shake hands!

AMONG readers of the NEWS are many manufacturers of air-conditioning equipment who today are seeking better channels of distribution—who are seeking distributing organizations that will produce for them increased sales volume. Facilities for production are ample. The problem now is sales.

In Kansas City a manufacturer may have a first rate distributor producing a highly satisfactory volume of business. In Pittsburgh his distributor may be falling far short of his quota, sales volume is discouraging. In Atlanta no distributor has yet been appointed. That territory is still open.

AMONG readers of the NEWS are many successful business men who are experienced in specialty selling. During the past 10 years these men have sold about ten million household electric refrigerators and more than a million and a half commercial refrigeration installations.

In the face of all kinds of sales resistance and regardless of general business conditions they have hung up new sales records each year.

They have *created* sales. They know *how to sell*. They control efficient *sales organizations*.

Now, with the refrigeration business well in hand, they are looking to air conditioning as a new field for expansion.

Some of them are already in the air-conditioning business and producing volume sales. A great many others are open for connections and are seeking a suitable franchise.

THE NEWS offers the manufacturer and the distributor a neutral medium, a meeting ground in which to become acquainted. It offers the manufacturer a means of contacting important potential distributing organizations.

The NEWS presents to the distributor the information he seeks in deciding upon his air-conditioning franchise and selecting the one he considers most attractive.

Gentlemen—through the NEWS—become acquainted!

Gentlemen: Shake hands!

SPECIAL—The Air Conditioning Progress Number to be published January 6, 1937, will be an outstanding issue with extra circulation. It will feature an analysis of the accomplishment to date in selling air conditioning to the public, with discussions of the industry's problems by leaders in the field. Regular display advertising rates apply. Forms close January 2.

**AIR CONDITIONING AND
REFRIGERATION NEWS**

Business News Publishing Co., 5229 Cass Ave., Detroit, Michigan

Around the World

With George F. Taubeneck

(Concluded from Page 6, Column 5)
police courts, by the tribunals, by the courts of appeal, the courts of assizes and the court of cassation.

The organs of "special" jurisdiction are the special tribunal, competent to try all crimes against the State, the Senate sitting as the High Court of Justice, and generally all the organs of administrative justice.

A professional movement officially recognized by Italy in April, 1926, is that of organizations of employers and employees and workers. There are the local unions, the provincial unions, the inter-provincial unions, the national unions and the federations.

Beginning with the local unions each successive organization is an amalgamation of a number of the groups preceding it in the list. In other words, the provincial union is made up of a number of local unions, the inter-provincial union consists of provincial unions, and so on.

There are numerous recognized federations in Italy, both in the arts and the professions and in the employer-employee industries.

The federations are united by the National Council of Corporations, the president of which is none other than the Head of the Government!

The National Fascist Party is under the leadership of the Duce of Fascism, (alias Head of the Government), and under the rule of a secretary appointed by royal decree on the proposal of the Duce of Fascism.

The secretary collaborates with a national directorate whose members are appointed by the decree of the Head of the Government on the proposal of the secretary.

In short, Il Duce appoints the secretary and then appoints the members of the directorate to assist him. Il Duce appoints also the federal

secretaries who control the party affairs in the provinces.

The adult membership of the party is about a million and a half. In addition there are 2½ million members of the National Balilla Institution, entrusted with the physical and moral development of Fascist children.

There is also a national institution for the employment of leisure time, with a membership of some 1,800,000. The Fascist Party has organized a number of other institutions for the benefit both of itself and of the public.

The area of Italy is 310,139 square kilometers (a kilometer is equal to about five-eighths of a mile) and the population according to the last census is 41,176,671. This averages 133 people per square kilometer and results in a crowded country. And Mussolini is pleading for more babies!

Jim Farley is noted for the number of positions he holds in American political life. He is frequently dubbed "Three-in-one" Jim.

But compared to Mussolini, Farley is a piker. The Signor is Head of the Government, Duce of the National Fascist Party, President of the Grand Council of Fascism, President of the National Council of Corporations, minister of a number of Departments, appointer of numerous offices, and ex-officio chief of quite a few other organizations.

He has what might be called a well-rounded schedule of activities. In addition to his regular duties he must receive foreign representatives, open new public works, attend various extra-political meetings, pose (Oh, boy!) for newsreel cameras, make speeches, visit his people, and think up new ways to browbeat the rest of the world. And he seems to do them. Whatever his faults, Mussolini has tremendous organizing and executive ability.

Church and State

With the Lateran Agreements of Feb. 11, 1929, the ancient bickering between Italian Government and Holy See was amicably settled. The Holy See formally recognized the Kingdom of Italy under the rule of the House of Savoy; the Vatican City was recognized by Italy with the Pope's sovereign rights thereon.

The bone of contention between the two has been the occupation of Rome itself. The Law of Guarantees, promulgated by the Italian Government with the avowed object of safeguarding the dignity, prerogatives and independence of the Pope in the exercise of his religious mission, and of regulating the relations between Church and State, was never recognized by the Holy See, which claimed sovereignty over Rome, and regarded the government as trespassing.

The apostolic seal now holds Vatican City, in the heart of Rome; but the mailed fist rules the seven hills that ring the Eternal City.

Education in Italy

The Ministry of National Education has jurisdiction over all the schools in Italy. Six subordinate departments attend to the central administration. In the interests of unity and economy textbooks are uniform throughout the country.

Elementary education is required for a period of eight years, and is free. Teachers are trained in special Training Institutes conducted by the State. Secondary education aims at the formation of character in youth and a certain amount of cultural knowledge. Higher education is only for students of better-than-average intelligence. State examinations are obligatory before the practice of any profession for which the necessary degree has been acquired.

Private schools, though encouraged by the government, are under control of the State.

There are twenty-one Italian universities. Ten really are State institutions; the other eleven are the result of the marriage between State and local universities. The rectors and presidents are State-appointed.

Various organizations have been established by the State to enable the children of the poorer people to attend school as much as is possible. Other means of imparting culture have been established in the form of museums, art galleries and public libraries.

Public education is quickened by the famous Italian theaters, by academies, by newspapers and reviews, and by various other literary projects.

The royal Academy of Italy has sixty members. They are appointed for life and enjoy special rank, title, prerogatives and dignities.

Banking System

The banking system of Italy is headed by the Bank of Issue, which is the Bank of Italy and the only one privileged to issue banknotes. By controlling deposit accounts it controls the activities of all other banking institutions in the country.

The system is complemented by three Public Banks, 314 Credit institutions, 450 Cooperative Banks, 113 Savings Banks and Loan Banks, 16 Societies of Agrarian and Building Credit, 290 Rural Banks, 248 Private Banks, and 76 Financial Societies. It certainly sounds prosperous, doesn't it?

Insurance is founded on solid bases, and includes powerful para-State institutions, private enterprises limited in liability and of very old standing, and mutual insurance companies of thorough reliability. The insurance is of the ordinary range, covering everything from transportation risks to hailstorms.

Under Fascist manipulation the public works of Italy have increased enormously. Highroads have been extended and improved, railroads developed, steamship companies encouraged to expand, air lines established, and ports improved. The postal service has been brought up to a high level, bridges have been built, dams constructed, reclamation work carried on, water supplies increased and improved, electrical plants established, telegraph service extended, telephone service reorganized and industrialized, wireless service greatly expanded, and huge public stadia constructed.

There is a similarity between the methods of Fascism and those of the New Deal in that both stress the need of public works. The New Deal has built dams, bridges, roads, public buildings and the like much as Fascism has done. The one main difference between the two forms of government is that Fascism can be ousted only by force.

One hears arguments for and against ultra-bureaucratic governments such as Fascism and the New Deal. It is proclaimed that the benefits created for and enjoyed by the public under these systems are far greater than those possible under ordinary conservative democracy or under absolute monarchy.

It is also averred (very softly in Italy) that the public, and especially the individual citizen, is deprived of independence and rights to liberty. The argument over the New Deal can be worked out at the election booth. That over Fascism cannot so easily be settled by the Italian public.

Agriculture

Italian agriculture is of two kinds: intensive and extensive. The former is conducted on the half-share plan, and the land for it is rarely leased to peasants. The principle products of this form of cultivation are industrial planting such as tobacco, staples like maize and potatoes, and to a lesser extent, forage and wheat.

In the extensive system the land usually is leased to the peasants for cultivation. The principle crops are cereals. Fruit and vegetables, cultivated most profitably on the intensive system, are confined to the south.

Because of mountains, hills and marshland, the arable land of Italy is limited to about twelve percent of the total area of the country. It produces rice, oats, barley, rye, hemp, beets, sugar, tomatoes, grapes, olives, oranges, lemons, limes, and livestock.

Industries

Italy has a wide variety of industries, but few if any have attained international commercial importance. Except for deposits of sulphur and quicksilver, the country is sterile of minerals, having neither mineral oils, coal, gold, copper, nor precious stones. The few deposits that can be exploited are scanty, irregularly situated and usually non-profitable. In such a condition, Italy turns to import.

The mechanical industries of Italy suffered a setback in the early part of the last decade, and since that time they have made slow progress. The foundries are the strength of Italy's mechanical industry; from them come the elements necessary for other industries.

Today there are several first-rate automobile factories in Italy, the most important being the F.I.A.T. of Turin. Italy's motor cars are noted for speed, not for multitude. Motor cycles, too, are more imported than exported.

In one species of wheeled vehicles Italy is preponderantly an exporter: bicycles. The industry begun in 1885. The majority of agricultural tractors used in Italy are made there, seven key factories producing machines that can be used on any kind of ground and for any kind of work. Italy is self-sustaining in its rolling stock for railways and tramways, and has in addition built up a sizable export trade.

The shipyards of Italy are capable of building every modern type of ship. Four of the thirty-one yards are government owned and operated. The

production figure for aeroplanes is not large, but as with automobiles, those that are manufactured create a stir of enthusiasm in foreign countries. More recently the government added a stimulus to the aeroplane industry in strengthening its air forces, both by land and sea. Wings over Ethiopia.

Italy today occupies fifth place in world production of chemical and electro-chemical materials, having developed in this field amazingly since 1915. Included in these products are chemical manures, soaps, candles, tannic extracts, gunpowder and explosives, and essential oils. Lombardy, bearing fully a third of the total production, is the center of these industries.

The sugar industry in Italy, beginning in 1903 with the cultivation of the sugar beet, expanded steadily. By 1933, 55 sugar factories and 20 refineries had sprung up, producing more than enough sugar for home consumption. Preserved fruits are present offshoots of the sugar industry, just as the production of alcohol followed sugar beets and molasses.

The manufacture of chocolate, biscuits, caramels, candied fruit and the like is centered in Turin, Milan, Perugia and Naples. Chocolate constitutes fully 50% of Italian confectionery export.

The art of liquor making, originated in Italy in the fourteenth century, was transplanted to other countries. A revival recently has been staged by the industry and at present its production overflows into export.

There are some 70 breweries, importing hops and malt for the most part from Germany and Czechoslovakia. Macaroni, from an unassuming beginning some years ago in Southern Italy, has become a national industry catering to an international market.

In the eleventh century paper making was started at Fabriano in the Marshes and spread from there all over Central Italy, flourishing to such an extent that Italian-made paper soon was recognized throughout various parts of Europe. With the introduction of modern mechanical apparatus in 1850 large scale production began. Today every kind of paper is produced, from cigarettes to paper bags. The excess for export is confined mainly to note and cigarette paper.

Electrical power in Italy is generated almost entirely by the use of water and only recently has been expanded. The dams, reservoirs, power stations, turbines, and other components of the industry have been established only since the beginning of the Fascist regime.

With the development of electrical power throughout the country, the electro-mechanical and electro-chemical industries have mushroomed out. Organic and inorganic products have entered the picture on a large scale.

STRANG EVAPORATIVE CONDENSER

Save Over 90 Per Cent on Condenser Water Costs

THE exclusive patented features of the STRANG EVAPORATIVE CONDENSER, including the submerged condenser and the pre-cooler in connection with the re-circulated and sprayed water and counter-flow air stream, afford the highest degree of condensing efficiency, regardless of summer water temperatures. Eliminates the problem of scale insulation on the outside surface of condensers or the inside surface of condenser water lines, and guarantees the distributor against serious competition.

The rapid development of air conditioning and commercial refrigeration equipment has already over-taxed the water supply and sewage disposal facilities of many communities. This condition will undoubtedly bring about the prohibition by municipalities and water departments of the use of such facilities entirely for condenser water purposes.

THE STRANG EVAPORATIVE CONDENSER is designed to afford water-cooled condenser efficiency-plus, regardless of water supply and sewage disposal facilities, by reducing the amount of water required for condensing purposes over 90 per cent.

For All Sizes and Makes of Compression and Refrigeration

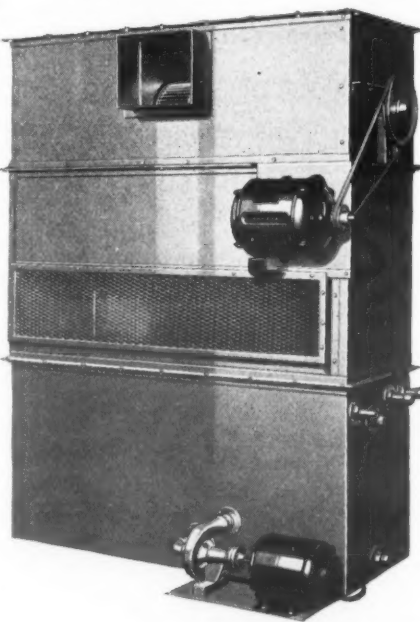
Compact STRANG units are now available to fit any size or type of installation, eliminating special mains, towers, pumps, and piping. There is a great saving of space with increased efficiency. Installation costs on old or new jobs are greatly reduced. Operating costs are reduced to a minimum with more than 90% of water costs saved. There are additional savings in power costs due to low head pressure. THE STRANG will pay for itself quickly in these condenser water-cost savings.

Write Today! Your inquiry is invited and full details and illustrated folder will be sent upon request. Every air conditioning and commercial refrigeration contractor, dealer or distributor should know about the STRANG EVAPORATIVE CONDENSER and the possibilities offered for increased business and profit.

The Motor Equipment Co.

216 East Douglas — WICHITA, KANSAS

Manufacturing Division, The Harrison Iron Works Co.



Distributors WANTED

Investigation by reliable individuals or sales and distributing organizations, where qualified to handle distributorships, is invited. With "water" becoming an increasing problem, with the rapid growth of air conditioning and refrigeration, this distributorship will prove one of unusual interest and profit.

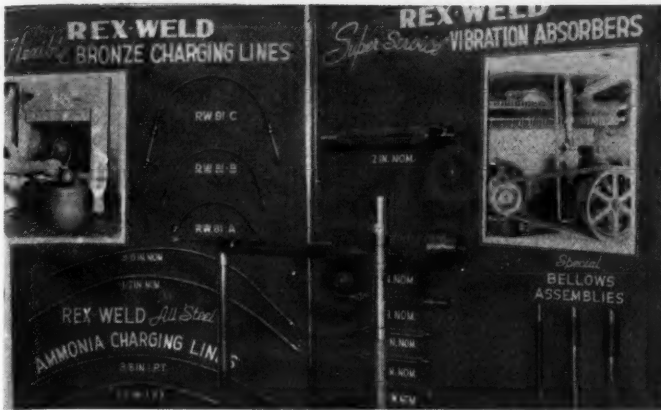
CONDENSERS EVAPORATORS

33 years specialized experience in this field has qualified us to give you intelligent, practical engineering cooperation on both electric refrigeration and air conditioning applications, large and small.

LONG MANUFACTURING DIVISION
BORG-WARNER CORPORATION
DETROIT, MICH.
WINDSOR, CAN.

LONG

Displays of Charging Lines, Controls and V-Belts Included in Service Men's Exhibits



Chicago Tubing & Braiding showed its line of Rex-Weld tubing and allied products, chief among which were a refrigerator charging hose and bronze vibration absorbers. The flexible, all-metal charging hose is made from a special bronze alloy containing no zinc.



Outstanding in Detroit Lubricator's display of expansion valves, thermostats, pressure, temperature, and water controls and solenoid valves were three recently introduced products—No. 211 thermostat, No. 197 humidistat, and No. 691 differential thermostat for cooling and air-conditioning use.



Gilmer's display showed, in its background, drawings of the various types of machines on which its V-belts were used. Features of Gilmer belts were emphasized in a three-pulley display at one side of the booth. Colored discs, slowing moving around the triangular circuit, carried the words—"silent," "dependability," and "efficiency."

Wile Describes Research That Resulted in Improvement Of Expansion Valve

MEMPHIS, Tenn.—Research technique employed in the development of more reliable and less-in-need-of-adjustment expansion valves was described by Dan D. Wile, chief refrigeration and air-conditioning engineer for the Detroit Lubricator Co., to service engineers at the recent annual convention of the Refrigeration Service Engineers Society here.

"The improvement in refrigeration equipment is much the same as the improvement in automobiles," said Mr. Wile. "There has been no revolutionary change but there has been a steady improvement in design and in materials of construction, just like the present day automobile is better because of details in design and improved materials."

"Expansion valves and other controls have gone through no revolutionary change, yet during recent years there has been a steady improvement in design and in materials." Mr. Wile took his audience behind the scenes, "unlocking the laboratory doors as it were," to see just how some of these developments are carried out.

"Several years ago," Mr. Wile began, "we set about to learn all we could of needles and seats in expansion valves because we were not satisfied with the rapid failure which occurred on some installations."

Erosion Thought Cause

"It was generally thought that needles failed due to 'wire drawing' or so-called erosion, and, true enough, failure occurred more rapidly with high head pressure and low suction pressure. This tended to confirm the erosion theory."

"However, when we examined hundreds of needles under a high-power microscope it became quite evident that they were not eroding due to wire drawing but that they were corroding by some sort of acid condition. Our examination disclosed that some systems were more corrosive than others even with the same refrigerant. This made it almost impossible to obtain reliable results from a field test."

"At that time there was no known method for measuring this corrosive condition of refrigeration systems, and in fact the experts argued that such a condition could not exist."

Measuring Corrosion

"We reasoned that if the refrigerant in the system were corrosive, it would also set up an electrolytic action and that if we measured this electrolytic action it would give us some idea of the corrosive condition."

"An apparatus was designed to measure the electrolytic action and so far as we know this had never been done before in a refrigeration system. The apparatus had to be built up especially for the purpose. It consisted of one unit about the size of a small strainer which was installed in the liquid line and contained two electrodes. This unit was connected with wires to an electric measuring instrument."

"A methyl chloride system operating in the laboratory was used for the first test, but it showed very little activity on our instrument."

"A small amount of water was then added to the system and the reading began to increase. It was not long until the reading had built up to about one-tenth of a volt. By the wildest stretch of our imagination we had no idea that such a powerful corrosive condition could possibly exist in a refrigerating system. Our measuring instrument was capable of reading to one-tenth of a millionth of a volt, and here we had an action one million times more powerful."

Instrument Necessary

"Our next step was to build a portable instrument to measure corrosive action of systems in the field. With this instrument we were able to predict with a fair degree of accuracy how long it would take for a system to corrode the needle and seat of the expansion valve. This made it possible to conduct accurately field tests, but in order to obtain reliable results it was necessary to run these field tests for nearly a year."

"There were a large number of materials we wanted to test out, and with some of these materials the heat treatment and method of handling during manufacture played an important part in their ability to resist corrosion. This made it necessary to test and re-test the materials several times, and by the field test method this would have required several years."

Speedy Action Needed

"Here was a serious problem, needles and seats were failing quite rapidly in the field when corrosive conditions existed in the refrigerating systems. We had no intention of waiting several years for a solution to this problem."

"I mentioned that we had an electrical measuring instrument to determine the amount of corrosion in the system. In the operation of this apparatus we noticed that when the electric circuit was left closed for a long period of time the reading on the instrument continually became smaller."

Hydrogen Washed Away

"If the circuit was then left open for a time the reading would return to the original amount. We know that when electrolysis took place a small amount of hydrogen was formed and this hydrogen had a tendency to stick to the surface of the electrode and thus insulate it."

"It was this protective coating of hydrogen which was forming in the measuring apparatus. We saw no reason why this protective coating would not also form when corrosion took place because corrosion and electrolysis are essentially the same phenomenon."

"At the needle of the expansion valve the refrigerant rushes through at a speed of something like 80 miles an hour and it appeared to us that such a high velocity could easily wash away any protective coating of hydrogen."

"In order to prove this theory we built up an apparatus entirely out of

glass, and it actually did prove that this was exactly what was taking place. This explained why the needle and seat of the expansion valve had such a difficult job, and it further gave us a means of building up an accelerator test in the laboratory."

"Based on this new information an apparatus was designed which could destroy the average needle in one-half hour. Within a few days we accomplished more than would otherwise have been possible in as many years' operation with field tests. As a result a material was produced which stood up against the terrifying abuse of this accelerated test. Then in order to be perfectly sure of our results an intensive field test was conducted."

Adjustment Not Necessary

Again referring to the automobile industry, Mr. Wile pointed out that years ago the carburetor was a complicated combination of adjustments. It was thought in those days that all of these various adjustments were necessary in order to obtain the proper operation. In the carburetor of today these unnecessary adjustments have been eliminated."

The same type of development has taken place in expansion valves. Now on the market are expansion valves which are pre-set at the factory so as to eliminate complicated adjustments in the field, and, an expansion valve has been produced in which the adjustment has been completely eliminated."

Constant Level Unsatisfactory

"Not so many years ago," said Mr. Wile, "it was considered satisfactory to control an air-conditioning system with a constant temperature thermostat. This type of thermostat is quite satisfactory for heating systems, but it was soon learned that a temperature of 75° F., although quite comfortable in mild weather, was entirely too cold during extremely hot weather."

"A laboratory in Pittsburgh began an experiment with human beings, and they found it was necessary to change the inside temperature with every change in outside temperature in

order to obtain the greatest comfort. They found a definite relationship which is called the comfort curve."

"Simple thermostats are now available which are capable of changing the inside temperature in accordance with variations in outside temperatures as determined by their comfort curve. It is not sufficient to control temperatures alone in an air conditioning system, because we find that in mild weather when the outdoor humidity is very high the indoors may be quite uncomfortable even though the temperature is sufficiently cold. This is caused by excessive humidity."

"Today we have humidistats which control the amount of moisture in the air and equipment is available so that the humidistat can be connected up with the variable temperature thermostats so as to give comfort under all conditions of operation."

Lynn Dealers Add New Refrigerator Lines

LYNN, Mass.—Three local retail concerns recently added new refrigeration lines to their stocks of merchandise.

World Radio Sales Agency, managed by E. P. Pelletier, took over sale of Crosley, Gibson, and Stewart-Warner refrigerators; Booma-Reed Oil Burner Co. added the Frigidaire line; and Modern Electric Co. Crosley, Fairbanks-Morse, and Gibson units.

Postcard Teasers Valuable Promotion for Utility

LOS ANGELES—Inserting small teaser advertisements on the face of postcard bills issued to customers, reminding them of features of Servel Electrolux refrigerators, has been an inexpensive but effective promotion stunt for Southern Counties Gas Co. The idea was developed by W. D. Thurber, advertising manager.

Wright Made District Head for Kelvinator

DETROIT—Appointment of Gordon Wright as national direct sales field representative for Kelvinator Corp.'s southwestern territory has been announced by Edward R. Legg, manager of national direct sales.

Mr. Wright's headquarters will be in Dallas, but he will contact national users in Texas, Oklahoma, Kansas, Louisiana, Arkansas, and part of Missouri.

For several years Mr. Wright was a consultant refrigeration and sales engineer in Mexico, West Indies, and Central and South America. For 12 years he represented Linde Refrigeration Co. of Canada abroad. Before his new appointment he had served for three years as one of Kelvinator's district commercial sales managers.

Bonus Contest Sets Sales Mark for Pfeifer Bros.

LITTLE ROCK, Ark.—Use of a salesman contest, in which a bonus is given to the winners, has resulted in more 1936 business for the appliance department of Pfeifer Brothers department store, Frigidaire dealer here, than in any year since 1930, reports J. E. Covey, buyer.

Contests are held for periods of 30 days, two or three times a year. They are conducted by the store itself, independent of national sales contests. Progress of sales is followed daily on the blackboard; scores are changed at regular morning meetings.

Bonus awards are the best inducements in salesmen contests, Mr. Covey believes. Prizes and parties also have been given, but have not proved as popular as the bonus plan.

Another factor which has helped increase the appliance department sales is the time payment plan used during the past three years, terms of which were \$1 a week, with three years to pay.

2 NEW EXPANSION VALVES FOR THE NEW YEAR

Two new expansion valves complete the popular A-P line which has won such universal preference because of incomparable performance. In addition to the Nos. 210, 215 and 220, there will be the Nos. 205 Thermostatic Expansion Valve and 206 Automatic Expansion Valve, both available early in the new year.

Model 205 Thermostatic Expansion Valve

All the advantages of the Model 210, but of smaller capacity— $\frac{1}{2}$ to 3-ton Freon. Has smaller bulb, giving quicker action. No piston or pin movement. Minimum friction. Extremely tight and positive shut-off. Not sensitive to rough treatment. Construction of this valve maintains its calibration. No bellows to break; no liquid carry-over on the off-cycle; practically fool-proof, and no service required.



Model 205

Model 206 Automatic Expansion Valve

Body of forged brass and built with the same precision as characterizes all A-P Valves. Unlike other expansion Valves of this type, moisture cannot get inside the hood, due to exclusive type of construction. This eliminates condensation and trouble due to freezing. Designed for $\frac{1}{2}$ to 3-ton Freon capacity.



Model 206

Write for Bulletin ERN

AUTOMATIC PRODUCTS COMPANY
MILWAUKEE, WISCONSIN

BRUNNER

Send for the New
REFRIGERATION CATALOG
Eight Models of Compressors
Forty-one Models of Highsides
from 1.6 H.P. to 15 H.P.
BRUNNER MANUFACTURING CO.
UTICA, N. Y.

A Coil-Maker's and a Refrigerant Producer's Exhibit at Service Conclave



Peerless showed models of its finned coils, unit coolers, "flash" coolers, expansion valves, and household evaporators which it markets under the "Humidipack." A glass-tube display in the booth demonstrated the features of the company's "rifled" tubing construction, the liquid being whirled through the rifled tubing and covering the entire surface.



R & H Chemicals Dept. of E. I. du Pont de Nemours & Co., Inc., exhibited several cylinders of its "Artic" brand methyl chloride. A lighted chart at the back of the booth emphasized the company's service facilities, showing its stock points in 57 principal cities. Moving color diagram explained the condition of the gas at various stages.

Ways of Getting Best Service from V-Belts Explained by Geare

MEMPHIS, Tenn.—Methods of installing V-belts and ways and means of getting the best service out of them were described by R. E. S. Geare, vice president and chief engineer, the L. H. Gilmer Co., to refrigeration service engineers at the annual R.S.E.S. convention held here recently.

"Certain definite advantages accrue to the operator of many classes of machinery when V-belt drives, rather than flat-belt drives, are employed," Mr. Geare claims.

"Among the advantages of the V-belt drive," stated Mr. Geare, "might be listed the following:

1. **Short Centers**—Large ratios between the driving and driven sheave may be secured, due to the gripping action of the V-type of belt. If the center distance practically equals the diameter of the large sheave the arc of contact will usually prove sufficient.

2. **Economy**—V-belt drives eliminate long center distances usually necessary with flat belts. The result is a conservation of valuable floor space, because large ratio drives can be accommodated within a comparatively small area.

3. **Efficiency**—Efficiencies as high as 98%, with properly designed drives, are secured.

4. **Cushioned Shocks**—As a V-belt drive starts in motion and each belt

seats itself in the groove—a cushioned effect develops which absorbs the shock of high starting torque, running jerks, and sudden overloads. This shock-resisting feature, peculiar to the V-belt drive, is independent of the resiliency in the belt itself. The general effect is to protect bearings on both driving and driven machinery.

5. **Low Maintenance Cost**—V-belts, for greatest efficiency, must be precision-built to exact lengths under full-load tension, so that, once seated and adjusted to usual working conditions, they seldom require much further attention.

V-belts require no lubrication, nor any type of belt dressing. They are unaffected by dirt or moisture.

6. **Low Replacement Cost**—Replacement requires renewal only of the belt and not of the sheaves, which, being of cast iron or steel, should last a

lifetime when used with the proper type of V-belt.

7. **Noiseless Operation**—A V-belt is a trapezoidal section of an elastic mass. As it enters a "V" groove the belt bends and the sides bulge, and lock firmly against the sides of the groove. Upon leaving the sheave groove, the belt straightens out—the bulge disappears—and unlocks the belt. The operation is noiseless.

"Different classes of machinery have varying characteristics and what might be the proper drive for one class would be improper for another. The belting, for instance, of a compressor drive might be entirely different from the belting of a fan drive. But the whole thing simmers down to a consideration of—

"(a) Characteristics of motor, or prime power.

"(b) Characteristics of driven machine.

"(c) Use of proper sheaves and belts in the design of the drive itself.

"Many present-day motors are built for use with across-the-line starting. This means that the motor quickly accelerates to maximum speed. Usually the driven machine is slower in acceleration due to greater inertia of reciprocal parts and hence a high starting torque develops in the motor.

"In belting from this motor to the driven machine, it then becomes necessary to have sufficient belts provided so that the area of belts in contact with the motor sheave groove will act as a sufficient brake to slow down the acceleration of the motor to conform to that of the machine.

"Were this not the case, and if there were an insufficient area in contact between the belts and the sides of the grooves, the motor sheave would tend to spin and slip within the belts themselves and burn the belts. It has, therefore, been recommended by authorities that the belt capacity be increased 25% as an arbitrary rule wherever across-the-line motor starters are used. This does not in any way affect the service factor which applies to various machines."

Service Factors

Motor Driven	Factor
Brick and Clay	1.2 to 1.3
Coal Mining Machinery	1.0 to 1.4
Cotton Ginning	1.0 to 1.2
Fans and Blowers	1.2 to 1.4
Flour and Feed Mills	1.2 to 1.3
Laundry Machines	1.1 to 1.2
Machine Tools	1.0 to 1.3
Metal Mining	1.0 to 1.4
Oil Field Machinery	1.2 to 1.5
Pulp and Paper	1.2 to 1.4
Printing Machinery	1.0 to 1.3
Pumps and Compressors	1.2 to 1.3
Rock Crushers	1.2 to 1.4
Textile (no slip)	1.2 to 1.5
Woodworking (high speed)	1.2 to 1.3
Speed-up Drive*	1.2
Gas Engine to Compressor	1.4 to 1.5

*Usually requires special engineering.

In this service factor table unit (1.0) is considered as the standard rating for normal loads. Mr. Geare pointed out. The correction factors are used as multipliers and are not added. On many drives subject to high overloads above normal rating, either in operation or at starting, the following tabulation indicating the preferable increase in belt capacity above the normal or unit rating may be used. Such drives often require motors with special overload features.

Normal Load Per Cent	Multiply Normal Load Factor By
100	1.0
125	1.1
150	1.2
175	1.3
200	1.4
225	1.5
250	1.6

When either table is used, across-the-line starting also adds 25% to these ratings of increase.

Different driven machines, said Mr. Geare, have different characteristics. They might be listed as follows:

1. A starting load, where the inertia of the whole machine must be overcome with across-the-line starting.

2. Reciprocating equipment, such as compressors, ice machines, pumps, etc.

3. Intermittent loads, such as reversing loads, rock crushers, etc.

4. Continuous heavy-duty loads, such as beater drives in a paper mill where there is possibility of sudden overloads and often a heavy starting under full load.

Flywheel Effect—Special attention should be given to the matter of the proper design of flywheels, Mr. Geare continued. Many old machines do not have enough flywheel weight. It often becomes necessary to redesign the flywheel when changing over to a V-belt drive. At this stage it is possible to refigure the flywheel effect of the driven sheave and make the proper allowances for the necessary WR2 effect to absorb shocks and vibrations.

Sheaves and Belts—The use of the proper sheaves and belts is very essential. For multiple drives, where symbol belts are used, Table "A" gives the minimum sheave diameter with the corresponding proper groove angle—

Table A

Cross Section, In.	Minimum Pitch Dia. of Sheaves, In.	Outside Dia. of Sheaves, In.	Angle Between Sides of Grooves
A— $\frac{1}{2} \times \frac{11}{32}$	3	3.375 5.5*	38° 38°
B— $2\frac{1}{2} \times \frac{7}{16}$	5.4	5.9 7.5*	26° 38°
C— $\frac{3}{4} \times \frac{1}{2}$	9	9.75 12*	36° 38°
D— $1\frac{1}{4} \times \frac{3}{4}$	13	13.875 16*	36° 38°
E— $1\frac{1}{2} \times 1$	21.6	22.725	38°

*And over.

For single belt drives, which rarely use a larger section than the "C" section, Table "B" gives a set of curves for "A," "B," and "C"—and the 2,000, 3,000, and 4,000 series Gilmer Fractional Horsepower belts showing the "V" groove angles for different outside diameters for 38° belts. This table should be used only in cases where single belts are employed and where the diameter of the driving or driven sheaves is of necessity below the minimum sheave diameters given in the preceding table.

"It is best to maintain sheave

diameters at or above the minimum diameter as shown in Table "A" for best results," stated Mr. Geare. "The use of diameters near the bottom of the curves shown in Table "B" tend to shorten belt life—due to the fact that they create a very great degree of flex in the belt. The larger the diameters of sheave over which V-belts operate, the longer the life of the belts.

Tensioning—One of the important facts to bear in mind is that V-belts must be tensioned just as carefully as flat belts. It has been a popular fallacy that V-belts, because of their gripping action, can be run slack and do not require any degree of tension. This is incorrect.

"It is safe to assume that the average commercial V-belt will show best results with a tension ratio between tight-side and slack-side, of approximately 3%.

"Unless the proper tension is maintained in the belts there is bound to be a tendency for slippage and a deterioration of the belts themselves, due to the motor sheave turning faster than the belt speed. This will wear the sides of the belts rapidly.

"There are several salient points which should be taken into consideration in the design of a drive from the standpoint of sheaves and belts—

"1. The sides of the sheave grooves must be smooth. If they are rough there will be rapid wear of the sides of the belts themselves.

"2. For conservative design, sheave diameters should be as large as possible.

"3. The bottom side of the drive should be the tight side wherever possible.

"4. V-belt speeds should never exceed 4,500 ft. per minute. About 3,500 ft. is a conservative average.

"5. The angle grooves of the sheaves should be exactly as specified for the diameter of the sheave.

"6. The belts should be tensioned properly, with a tension ratio of approximately 3%.

"7. A center distance adjustment of at least 10% of the total distance should be allowed to facilitate installation and allow for adjustment."

Belt Design—Various usages of V-belts require different types of belt design. In the symbol, or multiple type of drive, there is a given horsepower rating table used by all manufacturers which calls for a given strength per section of belt.

Of necessity, declared Mr. Geare these strengths are high and it has been usual for many belt manufacturers to use the ply type of belt.

In the symbol belt the pulling element consists of plies of numerous

(Concluded on Page 11, Column 1)

Table 'B'—V-Groove Angles

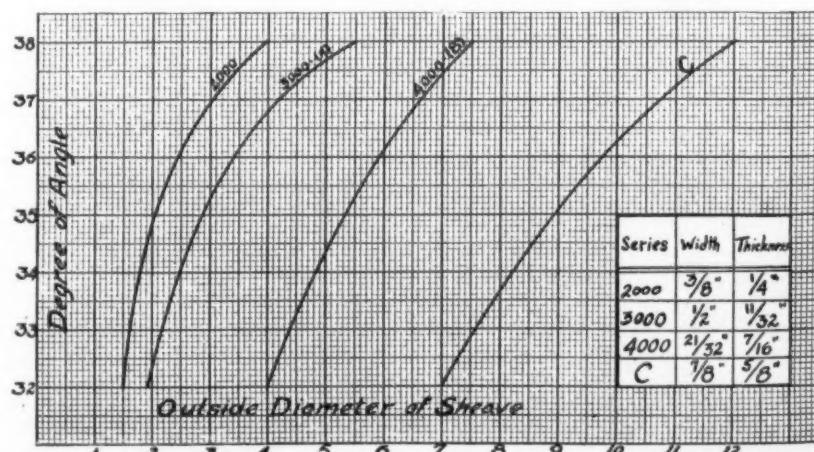


Chart showing V-groove angles for different outside diameters for 38° belt. This chart should be applied only where single belts are used.

ESOTO

Quantities Vary...

but Quality never Varies!

Every shipment is tested, checked, and rechecked before forwarding. Made as pure and free from moisture as the highest technical skill can make it, shipped to you in that same pure state. Extra Dry ESOTO maintains its reputation for high quality wherever men enjoy the comfort of automatic refrigeration.

Extra Dry ESOTO (liquid sulphur dioxide) and V-METH-L (Virginia methyl chloride) are shipped from 72 distributing points in this country and abroad.

For information or advice on any problem of refrigeration installation or servicing, write to F. A. Eustis, Sec., 131 State St., Boston, Mass.

VIRGINIA SMELTING CO.

WEST NORFOLK, VIRGINIA

They Came from Far Points to Memphis Meetings



During a recess in the jobbers' association meeting, (1) U. C. Boyles of Refrigeration Supply Co., Dallas, discusses the outlook for the future with (2) President H. S. McCloud of Williams & Co., Pittsburgh. (3) F. A. M. Dawson, vice president of Refrigeration Supplies Co., Ltd., London, Ont. (4) President J. D. Colyer and (5) Secretary Frank Gleason of Refrigeration Supplies and Parts Manufacturers Association settle a business detail.

Construction and Materials Used In V-Belts

(Concluded from Page 10, Column 5)

fine strands of special cord, which insure abundant strength. They permit great pliability in the belt itself. These cords are supported upon a highly heat-resistant though resilient rubber which holds the cords in an exact horizontal plane while the belt operates and gives a firmness to the body of the belt, which prevents whipping. This is the compression section.

Above the cords is a section of heat resistant tension rubber. Two jackets of bias fabric are essential for best operating results. The entire belt has very low stretch characteristics, combined with great strength.

In a belt which must flex over an extremely small diameter of sheave the construction of the belt is frequently of the single strand type.

In this case the thickness of the piles of cords have been supplanted by a thickness of merely one strand of a continuous heavy rubber impregnated cord wound helically around the bottom supporting rubber. The pulling cord, therefore, is endless. Yet, due to the thinness of the pulling element the theoretically perfect "plane of pull" is reproduced.

This belt is more pliable and strong over small diameter pulleys—because all of the pulling element is in tension at all times. When the ply type of belt operates over an exceedingly small pulley many of the lower plies of cord are forced into a state of compression and are, therefore, useless from the standpoint of carrying any load.

The point may be reached on a sheave of sufficiently small diameter, where with the same given size of belt the single strand type of belt will be stronger on the sheave than the ply type of belt, which actually has a much greater breaking strength. It is important, therefore, that the proper selection of the belt for the particular drive should be most carefully considered.

"In looking back over failures of V-belt drives which have come to my attention, I would say that the most prevalent cause has been under-belt-ting, and neglect of proper tensioning of belts," said Mr. Geare.

"This may have been due to improper designing of the drive where due consideration was not given the matter of acceleration of motor or driven machinery, or it may have been due to some other cause."

Merriam Institutes Elaborate Kitchen Planning Division

SCHENECTADY—A kitchen planning and equipment division that is elaborately planned and thoroughly systematized has been inaugurated by A. Wayne Merriam, General Electric distributor here.

Each division unit has its specific duties and functions clearly outlined in detail.

Manager of the enterprise and director of all its manifold activities, is E. F. Fyler. Under the supervision of Mr. Fyler, there are a number of individual departments.

Serving as kitchen headquarters for distribution of all materials and information is the sales promotion department. In addition to preparation of kitchen plans (using architectural service) and making quotations on various jobs, this department provides for clearing of all kitchen equipment orders to the order department.

Subordinate to the sales promotion department are wholesale division managers, retail store managers, and manager of the A.B.C. department.

Division manager clear to their dealers all material, sales plans, territory analysis, kitchen prospect files, quotations, and installation data.

Store managers do much the same thing for their respective salesmen.

The manager of the A.B.C. department contacts and carries on direct sales functions with architects, apartment house owners, builders, contractors, institutions, real estate operating companies, banks, New York State.

G-E Research Develops Electric Comforter

SCHENECTADY—Latest innovation in electrical household appliances is the electric comforter developed by W. K. Kearsley of General Electric Co.'s research laboratory.

This comforter is composed of two thicknesses of lightweight material between which is a fine, flexible conducting wire sewn in a zigzag pattern. Amount of heat in the comforter can be controlled by an adjustable rheostat attached to it.

Principal advantage of the comforter, according to the designer, is the surprising amount of heat compared to its weight, and consequent elimination of the piles of blankets and quilts previously necessary to keep the sleeper warm.

McCray Uses 'Controlled Cold Coil' in New Line of Walk-In Coolers

KENDALLVILLE, Ind. — A new type of walk-in cooler, designed for low ceiling applications, and available in three sizes, has just been put on the market by McCray Refrigerator Co.

Feature of the new cooler series is the "controlled cold coil," only 3 in. high, a patented development. This, in conjunction with a split-baffle system, is said to permit a material reduction in the height of the cooler, at the same time increasing headroom to as much as 6 ft. 4 in., in the clear.

The "cold controlled coil" is a broad coil, spread out to intercept the maximum circulation of air. Maximum distance from fin to tube is 1½ in. Header at each end allows multipass flow of refrigerant from liquid to suction header, allowing maximum heat transfer from each tube.

The constant pool of refrigerant, it is said, gives uniform flooding to the entire system, and quickly absorbs any disturbance of either temperature or humidity. Only one expansion valve is necessary, requiring but one adjustment for both sections of coil.

Suction pressure and temperature of the coil, McCray engineers claim, is higher in the new cooler, enabling a relatively higher relative humidity to be maintained. Regular McCray air circulation principle has been maintained, but a newly designed divided baffle system is used in the new cooler.

Warm and cold air flues are spaced to control the circulation of air within certain limits, to prevent products from oxidizing or sliming and reduce dehydration to a minimum.

Due to high heat absorbing capacity of the new coil, say McCray engineers, it operates at a high suction pressure,

increasing the efficiency and capacity of the compressor. The short path of the refrigerant from liquid leader to suction leader prevents the refrigerant from superheating excessively.

Exterior front and one side of the cooler is of white Duralite, with black base and trim.

Interior is of odorless wood, shellacked. Walls are built 5 in. thick, insulated with 3 in. of mineral wool. Cork insulation may be had at slightly higher cost. Cooler interior is also equipped with meat rails and hoods. All hardware is chrome plated bronze.

Height of the cooler is 8 ft. 7 in. over all. It is available in three sizes: 7 by 5, 8 by 6, and 8 by 8 ft. Net cubic capacities are 111.3, 235.08, and 325.4 cu. ft., respectively.

Apartment Returns to Master Meter Plan

BOSTON—In contrast to the current trend toward billing apartment house dwellers for electricity and electrical appliances on separate meters, one Boston landlord has filled up his new building by going back to the "master meter" basis.

Twenty apartments will be covered by the plan. Rentals will cover all costs, including electricity for lighting, cooking, heating, and refrigeration.

Appliances furnished in the apartments include Kelvinator refrigerators and General Electric ranges.

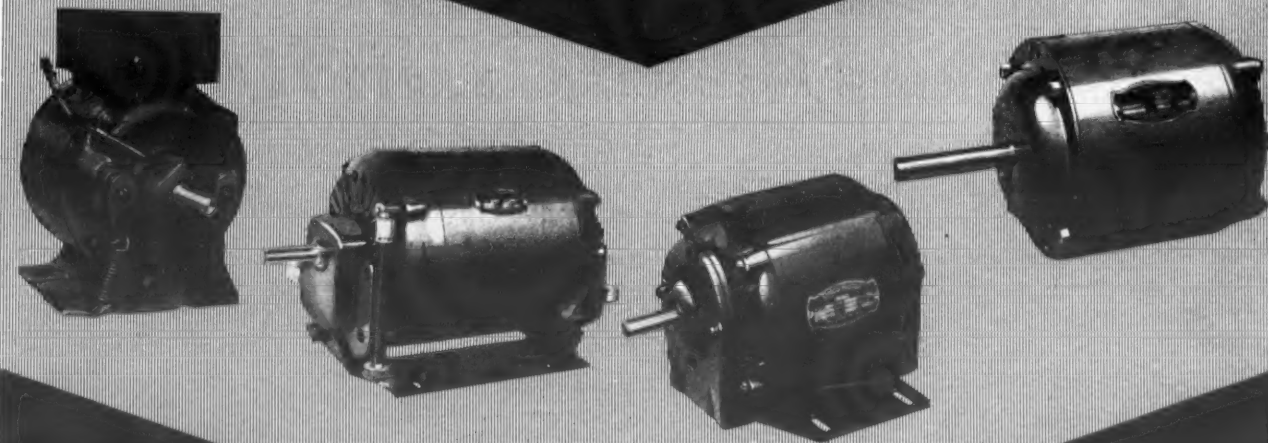
Popularity of the plan has been such that several other Boston apartment house owners are said to be preparing to switch over to the same procedure.

Ontario Electric Offers Novel Window Display

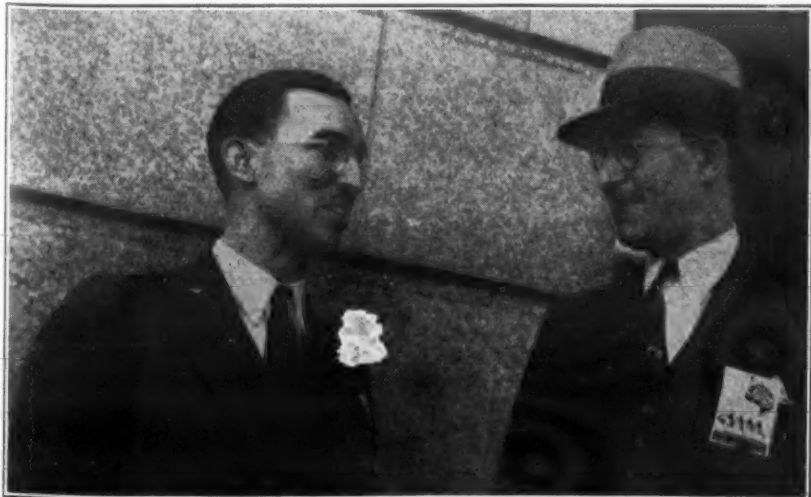
BUFFALO—Ontario Electric Co., local Crosley distributor, is rotating a "dancing" window display among its dealers, according to George Eckel, promotion manager of the distributorship. Each dealer uses the display for a short period of time.

Built around a highly polished dance floor on which gaily-dressed little couples waltz continually, the display measures 5 feet long, 3 feet high, and 2 feet deep.

Delco motors



East and West Meet at the Mississippi



E. W. McGovern of R & H Chemicals Dept. of E. I. du Pont de Nemours & Co., Inc., manufacturer of Arctic refrigerants, meets a west coast visitor to the parts manufacturers' meeting, W. F. Hancock of Refrigeration Service, Inc., Los Angeles.

The universally recognized dependability of Delco Motors is one of the foremost reasons why they are first choice of so many manufacturers in the electrical appliance field. These manufacturers have found that the reputation Delco Motors have won not only adds to product prestige, but also plays an important part in making refrigerators, washers, ironers and air conditioners easier for dealers to sell. The prospective buyer selects a Delco-powered appliance, knowing that it is certain to give the reliable service he wants.

DELCO PRODUCTS CORPORATION, DAYTON, OHIO

In Canada: McKinnon Industries, Ltd., St. Catharines, Ont.

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'I'll Wait Until They Perfect It'

AIR CONDITIONING sales managers who have been delving into the causes and reasons for the failure, so far, of that great new industrial plane to get off the ground and into the air, report back almost uniformly that there seem to be two major obstacles in the path of air-conditioning sales volume.

The first is cost.

Second is that old "stall" or "dodge" of the prospect: "I'll wait until they get it perfected."

Interestingly enough, the it's-not-perfected-yet attitude is being assumed by both prospective purchasers and prospective dealers. Which makes this objection doubly important. For it is no secret that perhaps the most important reason for the lag in the forward progress of the air-conditioning industry is the lack of qualified, aggressive dealers.

To anyone schooled in specialty salesmanship, an "objection" is merely something that needs a logical "answer." In this case, the answer is not only logical; it is so obvious one wonders why the objection has been allowed to live and hold any weight at all.

Should any salesman run into a prospect who offers the not-perfected-yet objection, it should be an easy and effective answer to run that prospect down to the automobile show.

"There," your salesman can point out, "is the answer to your objection. Those cars you see are so much better than those offered in the 1926 auto show, or that of 1930, or 1933, that there's really no comparison."

"You didn't wait until they 'perfected' the automobile before you bought one, did you? No, you didn't. You bought the best the market and your purse could afford; and you and your family enjoyed the blessings of convenient personal transportation."

"Nor will you refrain from buying one of those fast, sleek models you see out there today simply because it hasn't been perfected yet. You know next year's models will be better, and those of 1938 and 1940 may make these seem like ice wagons in comparison."

"But, you say, air conditioning is different? How so, brother, how so? Sure, it's expensive. So are automobiles. A superfine installa-

tion may run into a few thousand dollars; so does a big Cadillac or Packard or Pierce-Arrow, the finest in transportation.

"For \$600 you can get a really marvelous mechanism of personal transportation. For the same amount you can get a unit air conditioner which will vastly increase your joy in living—just as does the Ford or Chevrolet or Plymouth—and which will pay for itself many times over in increased personal efficiency and immunity to disease and ill health."

"Just as in the purchase of an automobile, you not only get what you pay for, but you will get your money's worth."

"Of course there will be improvements next year, and in the years following. Such is the American way—and God grant our American system be not thrown into the discard."

"But don't deny yourself comfort and health today just because the engineers may think up a new gadget tomorrow."

Some members of the air-conditioning business are inclined to blame the industry itself for the prevalence of the not-perfected-yet objection. Its continued existence, they say, is due to the fact that engineering thinking is still largely in the saddle.

It is only with reluctance, they declare humorously, that an engineer allows a product to leave the laboratory. It is never quite right, never quite good enough. And engineering concerns have been the leaders up to now in air conditioning: upon their insistence only the finest and most pluperfect of installations have been permitted.

That there is justification for this conservative attitude none will deny. On the other hand, the merchandisers point out that it is up to them to sell the equipment which is available; and that the benefits of a line-production conditioning unit are such that the markets for which its price is scaled should not be scared away from it.

Undoubtedly the use of *partial* air conditioning will stimulate the desire for *complete* air conditioning. Furthermore, an intensive drive on the part of manufacturers to secure aggressive distribution of unit air conditioners through specialty selling organizations equipped to handle them will result in a sales volume which will help speed the so-called "perfection" of *complete* air conditioning.

The greater the sales volume, the lower the price. And so, by answering the second major objection ("not perfected yet"), the industry should soon be able to present unassailable and tangible answers to the first major objection: price.

"Quoted"

Research Kept Up

THROUGHOUT the depression one activity never slowed down. That was the research conducted by scientists and inventors. No finer confidence in the future was demonstrated anywhere.

Banks failed because depositors distrusted them. Building ceased because few could see a future in constructing new houses. Good investment offers went begging because even those who had money dared not take risks.

But research kept on. At a meeting of the Engineering Society of Detroit, Harrison E. Howe, editor of the *Industrial Engineering Chemistry Journal*, revealed a long list of discoveries and inventions that have been brought out during the depression period and now are ready for use in the industries.

Research requires heavy investment of time and money. The scientists and research workers indeed showed themselves possessed of the faith which could remove the mountain of pessimism and bring back prosperity. —Detroit News, Nov. 16.

Letters

Sources of Information On Air Conditioning

American Furniture Co.
El Paso, Texas

Editor:

May I trespass upon your valuable time for a wee bit of information?

I am very desirous of taking up the study of air conditioning, but am somewhat at sea as to the best and most "up-to-date" sources for textbooks and data with which to study.

I will appreciate it very much if you will help me to a list of textbooks which may be purchased, a list of manufacturers of air-conditioning equipment, and any other sources of information that you think might be helpful in the study of this subject.

I have been working in the selling end of household refrigeration pretty nearly from the start, and wish to be prepared for air conditioning as and when it develops.

WILLIAM E. LIND.

Answer: The manual and textbook AIR CONDITIONING MADE EASY written by F. O. Jordan, which is being published in serial form in AIR CONDITIONING AND REFRIGERATION NEWS, presents a very clear and understandable explanation of what constitutes air conditioning, and provides concrete information on the latest approved engineering practices in the air-conditioning field.

This book also tells how to figure installations, and offers some information as to the proper set-up for an air-conditioning dealer or contracting organization.

AIR CONDITIONING AND REFRIGERATION NEWS through its news columns will continue to report and emphasize successful air-conditioning sales methods used in the field. This trade publication is the only one which has placed any emphasis on air-conditioning sales activity.

Copy of Complaint in Case on Patman Law

Gambill Distributing Co.
117-119 Ninth Ave., North
Nashville, Tenn.

Editor:

We note with interest the decision of the Federal Trade Commission in connection with the complaint charged against the United States Quarry Tile Co. as reported in your issue of Oct. 28.

We will appreciate a complete copy of this decision if possible to secure same by return mail.

WHEELS GAMBILL, JR.

Answer: Full text of the complaint issued by the Federal Trade Commission against the United States Quarry Tile Co., was published in the Nov. 18 issue of AIR CONDITIONING AND REFRIGERATION NEWS.

'Is There a Monarch Refrigerator?'

1722 James Ave. North
Minneapolis, Minn.

Editor:

Am enclosing self-addressed stamped envelope and would appreciate the following information:

1. Is there a "Monarch" refrigerator?
2. If so, who makes it?

GERALD F. BARRY.

Answer: The "Monarch" refrigerator has been manufactured by the Malleable Iron Range Co., Beaver Dam, Wis. We cannot say as to whether they are still manufacturing this refrigerator, as we have had no reply to letters written to them during the last year or so.

Canady Beer Cooler

United Wire & Supply Corp.
Providence, R. I.

Editor:

The inquiry from your Oct. 28 issue asking information on the Canady beer cooler unquestionably refers to the Canady beer cooler tube, made by the Canady Cooler Co., 461 Eighth Ave., New York City.

As we are a Rhode Island manufacturer and the inquiry originates here, perhaps you could identify No. 2966 for us, and we could discuss the matter with your correspondent.

H. W. DITTMER,
Sales Manager.

Answer: Thank you for your letter of Nov. 9, informing us that the Canady beer cooler tube is made by the Canady Cooler Co., 461 Eighth Ave., New York City. The inquiry regarding this beer cooler (No. 2966, published in the Oct. 28 issue of AIR CONDITIONING AND REFRIGERATION NEWS) was made by Mr. R. S. Wilber, 6 Foster St., Barrington, R. I.

Hidden Losses in Slow Charge Accounts Are Brought Out in Study Made By University Professor

CHICAGO—"The Ten Hidden Losses in Slow Charge Accounts," written by Dr. Clyde William Phelps, head of the Department of Economics at the University of Chattanooga, is being published by the research department of the Household Finance Corp. for distribution by retail stores.

Based on the premise that the American retailer loses more from slow accounts than from bad debts, that the costs associated with slow accounts constitute the most important item in the total cost of doing a credit business, and that the costs resulting from slow accounts can be practically eliminated by retailers acting either independently or collectively, the book explains the losses and how to avert them.

Increase Bad Losses

Hidden Loss No. 1, as described in the booklet, is "Slow accounts increase bad losses." Carrying such slow accounts, the book testifies, increases the amount that must be charged off as bad debts, increases the number of bad debts, and means gambling at heavy odds. By carrying slow accounts, Dr. Phelps explains, is meant the practice of continuing to sell on credit to a customer who has not paid his bill at the end of the credit period, say 30 or 60 days.

While the retailer is allowing the slow account to dangle, the customer is increasing the amount he owes, and at the same time the chances of collecting are getting slimmer. Meanwhile, Dr. Phelps relates, the retailer is taking a 50 to 1 shot at getting his money back.

Bookkeeping Costs Increased

"Slow accounts increase bookkeeping and collection costs," according to Hidden Loss No. 2, because: (1) it costs something to get the money; (2) promptly paid charge accounts require only one, while moderately slow accounts require many units of collection expense; and (3) in seriously slow accounts the collection expense wipes out all net profit and sometimes produces loss.

"Slow accounts increase interest costs," according to Dr. Phelps, who lists this as his third hidden loss. Although all charge accounts cause an expense for interest because the retailer has money tied up in his goods, slow accounts cause an extra expense for interest, the writer explains, and extra interest costs alone eat up the net profit from slow accounts in a few months' time.

Hurt Profit-Making Opportunities

"Slow accounts keep you from profit-making opportunities," Dr. Phelps warns in the fourth of his "hidden losses." These accounts, he says, lock up capital and prevent it from manufacturing a profit, often prevent retailers from taking advantage of cash discounts, and prevent them also from taking advantage of other profitable opportunities. By eliminating slow accounts, the reader is advised, extra capital is ready to take advantage of profit-making opportunities.

"Reduction of capital turnover" is the fifth indictment against slow accounts, Dr. Phelps declares, because increasing the turnover of capital is one of the main keys to retail profit. By reducing the number of slow accounts, it will be possible to increase the retailer's capital turnover and get a higher return on his money.

Loss of Customers

No. 6 is "Slow accounts cause loss of customers." A loaded-up customer, feeling guilty about his debts, often transfers his patronage; a slow account customer must inevitably be hounded; and because such policies cause misunderstanding, Dr. Phelps has found that the invariable result is the loss of the customer. A definite policy is recommended of not adding further charges to accounts that are not paid at the end of the credit period, for example, 30 days, until the delinquent items are paid.

If you could offer slightly lower prices you could increase your sales; if you could offer somewhat better quality for your money you could get more customers; if you could give somewhat better service you could get more business," is the reasoning of the author of the pamphlet.

Instead of accepting Hidden Loss No. 7, which he lists as "Slow accounts prevent you from increasing your volume and profits," Dr. Phelps suggests that the retailer invest his money in store modernization instead of slow accounts, and offer better quality or lower prices instead of slow account privileges.

"Customers have been educated to slow pay. They can be educated to prompt pay. If they are given the choice between better prices, quality, or service on one hand, and taking

their time to pay on the other, most of them would be delighted to pay promptly and take the former choice," the merchant is advised.

Embarrassing Positions

"Slow accounts put dealers into embarrassing and dangerous positions" is the ninth warning. They not only often force the retailer to borrow, but they also make it difficult for him to borrow. Seasonal let-downs and depressions, which make the going hard for all merchants, hit the retailer with slow accounts especially hard because he is "out on the limb."

When prices rise, retailers with slow accounts are again put in an uncomfortable position. P. A. O'Connell, president of E. T. Slattery Co. describes the situation: "As prices rise and credit customers purchase more freely, the total of accounts receivable carried by a store increases rapidly. The merchandise sold to charge customers must be replaced with new stock, probably at a higher price, necessitating an increase in working capital. If a large portion of accounts receivable must be carried from three to six months, where will the working capital come from?"

Causes of Bankruptcy

"One-third of commercial bankruptcies is due to lack of capital, and lack of capital in turn is often due to slow accounts," Dr. Phelps says.

The writer offers what he calls a "simple, easy-to-apply plan to make prompt paying customers out of slow accounts."

There are six main points in the plan: investigate thoroughly; explain clearly; follow-up promptly; suspend slow-payments; help a delinquent by showing him how he can pay immediately, by borrowing if necessary; act decisively.

To put the program into operation, the retailer must decide on some definite credit period, and refuse to allow further charge purchases on accounts still unpaid at the end of that period, Dr. Phelps concludes.

Stedman Points Out Needs of Modern Merchandising

CHICAGO—Five essential points in modern merchandising were stressed by G. E. Stedman, head of planning and public relations operations for Cramer-Krasselt Co., Milwaukee, advertising agency, in a recent address before 175 store owners, merchandise managers, and buyers at the monthly luncheon meeting of the fourteenth Floor Mart Club in the Merchandise Mart.

His points were: 1. establishing the need for an article through proper presentation; 2. dramatizing the demonstration; 3. merchandise; 4. justifying the purchase by showing the consumer that it costs more to go out without the product than to buy it; 5. the use of married salesmen, because they understand better the needs of the housewife.

"Selling today must be the creation of acceptance on the part of the buyer," Mr. Stedman declared. "Price is not so important now as quality and utility. It is up to the salesman to create more 'buymanship' on the part of the consumer, and to put less emphasis on salesmanship."

"The modern manufacturer," Mr. Stedman continued, "can well afford to make investments in salesmen, rather than machines, by developing personality and the ability to sell."

Predicting a fine future for the housewares field, Mr. Stedman said that recent surveys made by his company show that the desire of individuals for home appliances, and their interest in home modernization, is constantly increasing. Another national survey, Mr. Stedman said, indicated that 6,000,000 new homes will be erected in the United States before 1942, providing an excellent outlet for the housewares field.

Westinghouse Dealer Club Celebrates Anniversary

ELKHART, Ind.—Westinghouse Refrigerator Distributor Club, composed of all Westinghouse refrigerator dealers in northern Indiana, recently celebrated its third anniversary with a banquet at Christiana Tavern Country Club near here.

Various problems of merchandising, campaigns, and competition are discussed at the club's monthly meetings. L. C. Klose, Electric Sales and Service, Elkhart, is president of the club; J. W. Milligan, Foster Shop, La Porte, is secretary-treasurer.

Service Methods

Askin Tells RSES What Not To Do in Installing Unit Coolers

MEMPHIS, Tenn.—Forcedraft unit coolers have an established place in commercial refrigeration applications, but there are many "don'ts" in the installation and use of unit coolers which installation and service engineers should observe, Joe Askin, chief engineer, Fedders Mfg. Co., Buffalo, told delegates to the R.S.E.S. convention at the Friday technical session of the convention held here last week.

"In discussing the subject of forceddraft unit coolers with several service engineers, said Mr. Askin, 'I found some very wide differences of opinion.

"I started to ask one of the men where to use them but I got no further, as his reply was: 'Don't touch them—they are poison.' I asked him why. He answered that some time ago he installed one and the so and so thing did so and so.

"Another service engineer whom I asked the question, 'Where would you use unit coolers?' answered: 'Use them anywhere to cool anything that requires a temperature of 38° or higher. I have used dozens of unit coolers without any trouble, and would not use anything else. Just use them intelligently and you will have no trouble.'

Unit Cooler Uses

"Unit coolers are being used for every conceivable purpose. I have seen them used in precooler rooms for cooling beer, in huge vegetable coolers, meat coolers, mushroom cellars, showcases, dairy boxes, fur storage rooms, living rooms, and even in undertaking establishments for preserving cadavers.

"The second service engineer to whom I spoke made a very broad statement. He said: 'Just use them intelligently.' That made me think. Just what did he mean by an intelligent installation?

"I investigated and found that to obtain a good installation there are several things which a person is not to do. The things which the service man is to do in making an intelligent installation seem to be known by him."

The Ten 'Don'ts'

The 10 "don'ts" of unit coolers, as enumerated by Mr. Askin, are as follows:

- 1.) Don't select an undersized unit for the job.
- 2.) Don't try to obtain temperatures much below 38° F. in the refrigerator.
- 3.) Don't set the pressure control at too close a differential.
- 4.) Don't set the pressure control so that the cut-in pressure is at or below the pressure corresponding to the melting point of ice.
- 5.) Don't install the unit above the door.
- 6.) Don't use a thermostat for either controlling the compressor motor or the fan motor.
- 7.) Don't use unit coolers in meat coolers where there is an extremely slow turnover of the products.
- 8.) Don't arrange a shut-off switch for the fan motor unless it is absolutely necessary.
- 9.) Don't tell the customer that you positively guarantee that the unit cooler will maintain a certain definite relative humidity in the box.
- 10.) Don't knock competitive units or units which you do not happen to be installing.

Different Names Used

Some of the names given to this type of evaporator which essentially consists of a coil, a thermostatic expansion valve, a fan, a motor, and a casing are:

Blower coil
Forceddraft unit cooler
Cold diffuser
Humidifier

Unit cooler
Forced convection cooling unit
Convactor
Conditioned air cooling unit
Humid-temp unit
Humid-cooler.

Use of unit coolers, said Mr. Askin, came into general use several years ago. It was discovered that in a given size refrigerator, if a coil of 100 sq. ft. surface were necessary to cool this refrigerator down to 38° F., by placing a coil with a fan and motor behind it the coil size could be reduced to approximately 33 sq. ft.; and equally good results and equally cold temperatures could be obtained.

It was also discovered that if a unit cooler having more than 33 sq. ft. surface were to be used for this refrigerator much better results could be obtained.

Unit Cooler Advantages

Some of these results, declared the speaker, are the addition to better circulation, closer temperature differential and more uniform temperature, higher relative humidity, and less drying out of the food in the refrigerator; and the unit could also be operated at higher suction pressures. This would increase the capacity of the condensing unit, and would result at times in the selection of a smaller size compressor.

The unit cooler had another advantage, in that it was much more compact, so that greater storage space in a given size refrigerator was available by using such a unit in preference to natural convection coils.

"For a while it appeared as if forceddraft unit coolers were to entirely replace natural convection units," said Mr. Askin.

"Then as their use began to increase, things looked as if they were going the other way and it appeared as if forceddraft unit coolers were to be condemned entirely, for who didn't have trouble with his first installation?

Both Types in Use

"Today, however, we find that both unit coolers and natural convection coils are being sold side by side, and that both types serve a useful purpose in the refrigeration industry.

"To determine how to select the proper size unit for a given refrigerator let us first determine what the load is, on that refrigerator. Take for example a walk-in cooler 6x8x9 ft., 6 ft. wide by 8 ft. deep by 9 ft. high, having a 3-in. cork insulation.

"It is desired to maintain 40° box temperature, and the location of the unit is in a town where the maximum air temperature reaches 100° F.

"The installation is in an establishment where a heavy service condition exists. In other words, the refrigerator doors are opened often and occasionally a load of warm meats are placed in this refrigerator. At this point let me state that most manufacturers agree fairly closely as to the heat transmission loss through the insulation, but no two agree as to the service load.

Figuring Service Load

"By service load I mean heat loss due to opening and closing of doors, product load of warm foods stored in the refrigerator, warm air infiltration, lights in the refrigerator, unit cooler motor, etc.

"One manufacturer adds the unit cooler's motor load. The others either neglect this load or have the heat of the motor deducted from the rated capacity of the unit.

"One manufacturer neglects almost entirely the heat loss through the floor; the others treat the floor as if it were one of the sides of the refrigerator.

"One manufacturer uses a single factor for both heat loss through the insulation and service; one or two others use a factor based upon the volume of the interior of the refrigerator.

"The manufacturers have not, as yet, got together to work out a code for determining the loss of a given refrigerator, and for determining the method of rating unit coolers. In other fields, such as in unit heaters and in compressors, a very strict code exists, and most manufacturers adhere to this code 100%. Until such time that codes are adopted for determining the heat loss of a refrigerator and for determining the selection of unit coolers, it will be necessary to refer to the catalogs printed by the particular manufacturers whose line of units you happen to be using.

"Methods used by these manufacturers for determining heat loss and size of unit are very interesting and instructive, but I will not take up your valuable time to go into details. However, in Table 1 there is a summary of what the load would be for the 6 ft. by 8 ft. by 9 ft. refrigerator in question as different manufacturers would figure it. The heat losses were computed by representatives of these various manufacturers.

Heat Loss Computations

Heat Loss of 6 ft. by 8 ft. by 9 ft. Cooler
Heavy Service—60° T.D.—3 in. Cork
B.t.u. Per 24 Hours

Manufacturer	Insulation	Service	Total
A	36,720	44,600-7,500	88,820
B			70,600
C	49,000	27,000	76,000
D			75,700
E			85,000
F			132,500
G	37,600	44,500	82,100
Average			87,246

"Where no separation of insulation and service load is shown, the total load is given as being computed by a single factor. You will observe that the total load varies from 70,600 B.t.u. per day minimum to 132,500 B.t.u. per day maximum.

Kerotest Men Have Own Convention



Four representatives of Kerotest Mfg. Co. at the Memphis Parts Manufacturers Association convention are all smiles as they discuss this year's business and the prospects for 1937. They are: 1. A. F. Fine, 2. E. J. Kimm, 3. Vap D. Clothier, 4. G. C. Taylor.

day maximum. The average of the seven manufacturers' determination of the heat loss is 87,246 B.t.u. per day."

'Basic Rating' Used

One manufacturer, pointed out Mr. Askin, gives what is known as a basic rating which signifies that the heat transfer is in direct proportion to the temperature difference between the air in the refrigerator and the refrigerant temperatures.

Another manufacturer advises that one should figure 25° temperature difference between air in the refrigerator and the temperature of the refrigerant during the running period.

"For example, if you want a 40° F. box you may operate the unit so that the pressure control shuts off

at a pressure corresponding to 40 minus 25 or 15° F. Therefore, the rating of the units must be given for 25° temperature differential.

Average Figures Given

"Two other manufacturers use 14° F. which signifies the average temperature difference between the air in the box and the average refrigerant, and they rate the units accordingly.

"It is important to remember that irrespective as to which manufacturers' unit is selected a unit cooler does not refrigerate when the compressor is off; all it does is circulate air in the box if the fan is running during the off portion of the cycle.

"For this reason the off period of the compressor should be taken into (Concluded on Page 14, Column 1)

in over a MILLION HOMES

Bonderizing

is protecting the finish of electrical REFRIGERATORS

The continued finer appearance and complete absence of rust on the Bonderized refrigerator is convincing homemakers of the extra value that Bonderizing provides.

Bonderizing assures greater stability to the enamel finish, and gives the dealer an extra sales argument. The Bonderized refrigerator sells easier, gives the customer greater satisfaction and avoids expensive refinishing.

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A new book showing what a salesman should know about Bonderizing is available. Send for your copy.



PARKER

Processes CONQUER RUST
BONDERIZING • PARKERIZING



Controls to Be Used On Unit Cooler Installations

(Concluded from Page 13, Column 5)
consideration. The average load of the seven manufacturers listed of 87,246 B.t.u. per day should be divided by 16 in order to obtain the B.t.u. per hour which the unit cooler should transfer, if 16 hours out of 24 is selected as the basis of measurement, that is, two-thirds running time of the compressor. In this case the load works out to 5,450 B.t.u. per hour."

With respect to fan controls, Mr. Askin said that, in general the fan motor of unit coolers should operate continuously, day after day, month after month, and year after year, never shutting down except when there is an electrical disturbance. This rigid service calls for the use of the highest grade motors obtainable.

Many manufacturers advise that these motors should run continuously for best operation, both from a humidity and circulation standpoint. Some manufacturers so arrange a motor switch which shuts off the motor during a portion of the running cycle of the refrigeration compressor.

"This type of switch is known as a reverse cycle switch as it cuts out at high pressure and cuts in at low pressure, acting just opposite of the pressure control," Mr. Askin explained.

'Economizer Switch'

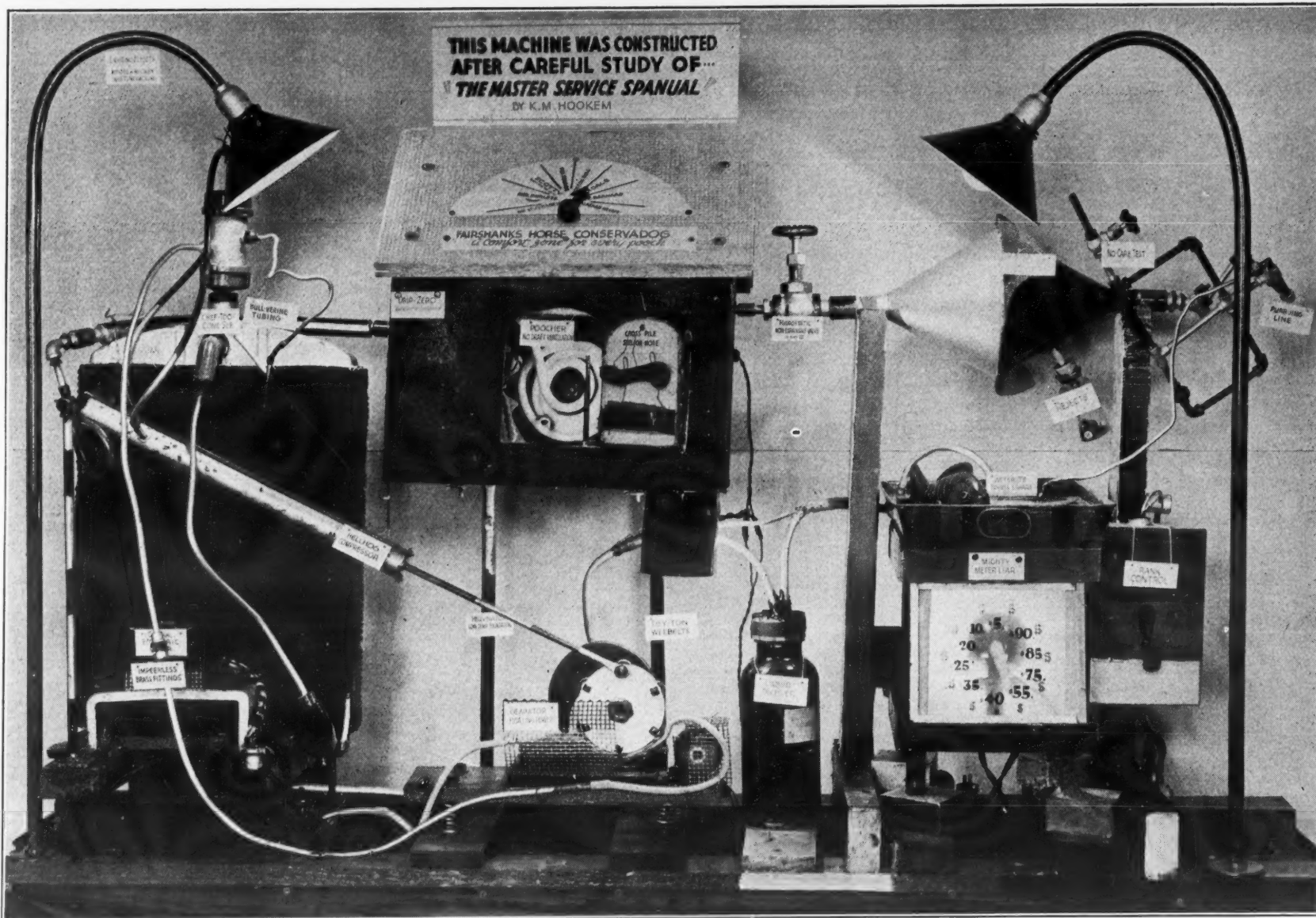
"Service engineers call this switch an 'economizer switch,' I presume because it is supposed to save electricity."

Other manufacturers furnish motors having three speed controllers, and during cool days the operator turns the switch from high speed to medium speed, or to low speed, in order to cut down the air volume and, incidentally, decrease the unit capacity.

Many manufacturers insist that the installation service engineer place a switch at the outside of the refrigerator near the door so that they may shut off the fan motor when they enter the refrigerator. Their purpose in doing this is to eliminate any chance for developing a stiff neck when exposed to drafts as they enter the refrigerator to change a keg of beer or to cut off a side of beef. Others accomplish the same result by placing a button in the door jam so that when the door is opened the fan motor shuts off.

"I shall feel that my efforts will not have been entirely in vain if, whatever unit you are using, you study all of the available literature and instructions which that manufacturer has to offer," said Mr. Askin. "As I mentioned above, the manufacturers have not as yet agreed as to how to rate these units, and each manufacturer has his own peculiar characteristics in his line of units and unless you are acquainted with them you may have difficulty with the installation. To get the best results from these units select a line, become acquainted with that line, and stick to that line."

Ansul Exhibit Was in Nature of a Service Engineer's Nightmare Come to Life



Well-known industry products were burlesqued in Ansul Chemical Co.'s display, which advised: "When Refrigeration Goes to the Dogs, Let the Ansul Twins Help You." The machine displayed consisted of a refrigeration system, built, the sign said, after careful study of "The Master Service

Spanual, by K. M. Hookem." The doghouse was a "Fairshanks Horse Conservadog," with "Poocher No-Draft Ventilation." It was supported by the "Hellvinator Low-Temp Foundation." Bone and dog biscuit were hung on the door in a "Cross Pile Selfor-More." Insulation was of "Drip-Zero." Oper-

ated by a "General Eccentric" motor, the "Hellhog Compressor," driven by a "Dey-ton Weebelt," forced liquid through "Bull-verine Tubing" to a "Chief-Too-Come-See" radiator, out again through tubing with "Impeerless Brass Fittings" into a "Liquid Deceiver," and then into a "Wetrite"

Dryass Sahara" dryer, while the "Mighty Meter Liar" spun 'round and 'round. Switch was a "Rank Control," and "No Care Test" and "Henry VIII" valves were used, separated by an "American Rejector" strainer. Lighting effects were furnished by "Mickey and Minnie Westingmouse."

Home Service Classes Featured by Skits

SAN ANTONIO—Skits feature the series of home service classes being given this fall by members of the Home Service Division of San Antonio Public Service Co.

An appliance, enclosed in a blue and gold satin lined cabinet, presides as "master of ceremonies" at each of the classes. First series of demonstrations featured use of the space heater in place of the range oven for heating the kitchen. In the next series, small appliances were used.

Four future programs will include skits featuring oven cookery, using both gas and electric ranges.

Polley Stresses Necessity of Selecting Condensing Unit Of Proper Capacity

MEMPHIS, Tenn.—Necessary considerations in determining compressor capacities, and proper steps in selecting the right equipment for commercial installations, were outlined by Ray F. Polley, head of the Mills Novelty Co. refrigeration department, in his talk before the recent convention of the Refrigeration Service Engineers Society here.

"The selection of a condensing unit must take the complete installation into consideration," said Mr. Polley. "The compressor itself, regardless of its capacity, will not operate efficiently, if the low side of the equipment does not balance with the compressor."

"It is very essential that the low side of the system be of the proper capacity so that it can evaporate refrigerants at the highest possible suction pressure to enable the condensing unit to operate at its maximum efficiency."

"Theoretically, the capacity of a compressor increases at higher evaporating temperatures and pressures, due to the greater density and weight per cubic foot of the gas at the higher pressure," Mr. Polley explained.

"Table No. 1 shows the capacity and wattage at a constant r.p.m. for a methyl chloride unit. Table No. 2 shows how the load on the motor determines the actual refrigerating capacity."

"At a constant r.p.m., the displacement is constant so that the higher the pounds of back pressure, the higher the weight of gas pumped. As a consequence, more liquid can be evaporated."

"The refrigerating effect per pound of methyl chloride is approximately 150 B.t.u. per pound; therefore, the denser the gas, the heavier the weight per pound, the more weight can be pumped; therefore, the greater the refrigerating effect."

"The displacement of a 2 1/2 by 3 two-cylinder compressor is 22.85 cu. in. per revolution, or .0138 cu. ft. per revolution, and .0138 times 385 times 60 is 318 cu. ft. of gas pumped per hour. 318 times .0198 is 63 pounds at 0°. 318 times .02998 is equal to 95 pounds at 18°, which is 100% efficiency."

This 100% efficiency figure, said Mr. Polley, is known as the theoretical capacity of a machine or the total amount of gas which might be pumped under ideal conditions. These conditions are never attained because of the conditions involved, superheat of

returning gas, and various other items. "It is apparent," stated Mr. Polley, "that if gas is drawn into the cylinder, it does not enter as easily as if it were given a super-charged effect. This results in a higher volumetric efficiency and higher back-pressure. As the question of theoretical capacity is approached, the figures will show the comparison seen in Table No. 1."

"To put a constant load on the motor, the speed must be slowed down, and as a consequence, the capacity must be decreased as shown in Table No. 2."

All manufacturers of condensing units have made actual capacity tests on their equipment, under normal conditions, the speaker pointed out. For example, on the air-cooled models, they have operated them in a room maintained at the various temperatures at which the capacity is given and maintained the low-side pressure to correspond with those given on the capacity table.

This has also been done with water-cooled units, and water temperature maintained at a constant temperature to make sure that the capacity of the equipment was as indicated on the capacity table.

"When estimating the condensing-unit requirements, it is very necessary

to take the manufacturer's rating and be sure that the room or water temperature is properly estimated, so that a compressor of the proper capacity can be selected," Mr. Polley advised the service engineers.

"It is impossible for the man in the field himself to determine the exact compressor and capacity, and practically every manufacturer has spent considerable time and money in giving the capacity tables to enable their field representatives to select the proper units. By all means, use the capacity tables as given."

Insulation of a refrigerator, the speaker declared, is one of the fundamental parts of a refrigeration installation. A definite value for the installations must be obtained, and knowing the temperature that is to be maintained in the refrigerated enclosure and the higher temperature to which the refrigerator is to be exposed, it can be definitely determined—the difference between the refrigerator temperature and the room temperature; and knowing the rate of heat flow through the installation, it is a very simple matter to determine heat load on the refrigerator itself.

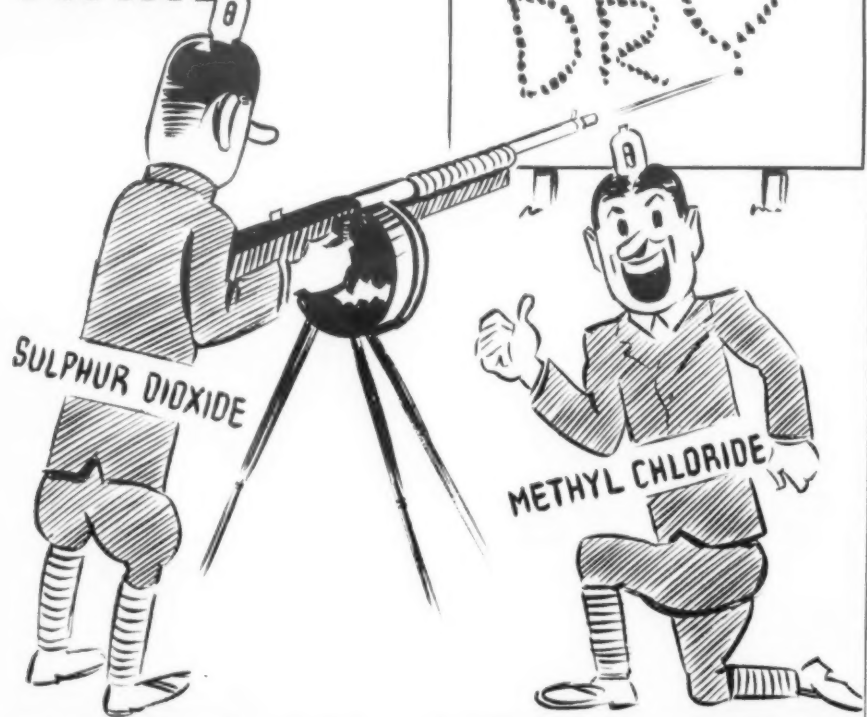
If more than one refrigerator is to be used in the installation, the total heat load must be obtained by finding the sum of the individual loads, as the total is the load the compressor will have to handle.

Manufacturers have given this value in many different rates, some at an hourly B.t.u. rate, others for a 24-hour rate, while still others have assumed that the compressors should operate 12, 14, or 16 hours out of a 24-hour period.

After the insulation or the heat-leaking value of the equipment is known, the proper coils must be selected. All manufacturers as well as compressor manufacturers have determined by experiments the exact heat-absorbing properties of their coils, and it is a simple matter to select from the coil manufacturer's catalog the proper coil to use for a particular installation.

(Concluded on Page 15, Column 1)

THE ANSUL TWIN



TARGET PRACTICE

ANSUL CHEMICAL COMPANY

MARINETTE " " " " " WISCONSIN

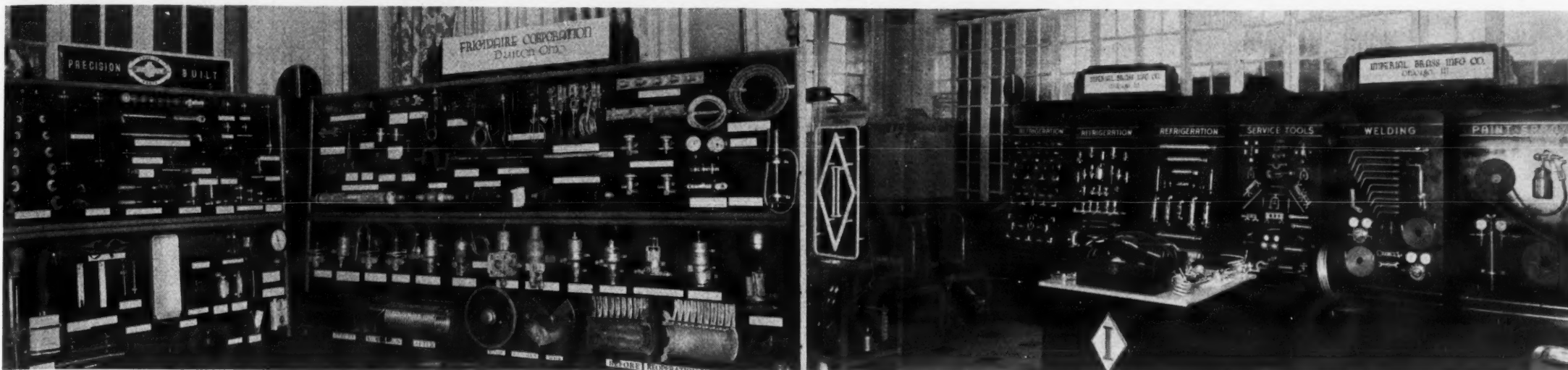
Table 1

Evaporator Temperature	Evaporator Pressure	R.p.m.	Watts	Density	Theo. B.t.u.	Actual B.t.u.
0°	4	385	1,200	.0198	9,300	6,110
18°	13	385	1,400	.02998	13,400	10,000
40°	28	385	1,570	.0433	20,000	16,000

Table 2

Evaporator Temperature	Evaporator Pressure	R.p.m.	Watts	Density	Theo. B.t.u.	Actual B.t.u.
0°	4	385	1,200	.0198	9,300	6,110
18°	13	340	1,200	.0299	12,000	9,100
40°	28	290	1,200	.0433	17,000	13,600

Frigidaire and Imperial Brass Display Lines of Replacement Parts



Frigidaire Corp. displayed its complete line of replacement parts, including copper tubing, expansion valves, condensing unit bodies and parts. Tools shown included leak detectors for Freon-12, standard compound, and pressure gauges. The company also exhibited its repair service for condenser-receivers with broken water coils, and replacement unit for ice cream cabinets.

Imperial Brass, in a double-length exhibit, showed its line of refrigeration valves, fittings, strainers, and dehydrators, service tools, and welding and paint spray equipment. Various samples of the company's products, a service tools kit, and other parts were displayed on a table out in front of the center of the booth.

Details Considered in Selecting Proper Unit for Commercial Installation Are Listed by Polley

(Concluded from Page 14, Column 5)

It is desirable, in fact almost necessary, said Mr. Polley, that a coil be used that will allow the condensing unit to operate on as high a back-pressure as possible, as the compressor will operate more efficiently with a gas that has a higher density and a greater weight.

"The selection of water-cooled or air-cooled equipment is purely a matter of local conditions," declared Mr. Polley. "In many cases, it is not desirable to use water-cooled equipment due to the fact that the water has a high mineral content that will affect the condenser.

"If air-cooled equipment is used it is necessary that the equipment be installed in a location where it will have free air circulation. Due to the fact that air-cooled units will operate on higher pressure, especially during the summer months, its capacity will be somewhat decreased and a larger motor may be used to compensate for this condition.

"Water-cooled equipment capacity can be varied greatly by regulating the flow of water. In many cases, the water may be at a costly rate, in which case it is more desirable to operate the equipment on a higher pressure, increasing electrical cost somewhat, and restricting the flow of water as much as possible."

Small suction lines are the cause of many service problems, Mr. Polley cautioned. A coil using $\frac{3}{4}$ -in. copper tubing should have a $\frac{3}{4}$ -in. return line to maintain the increase in volume

constant, and the use of a smaller line results in a decided decrease in efficiency, he said.

Mr. Polley then listed the details to be considered in selecting the proper refrigerating equipment to handle a commercial installation as follows:

A.—Heat Leaks

1. Maximum room temperature.
2. Desired storage temperature.
3. Wall construction.
 - a. Thickness of insulation.
 - b. Condition of insulation.
 - c. Workmanship on walls.
4. Total square feet of surface.
5. Set and condition of doors and windows.
6. Use.
7. Extraordinary loads due to unusual conditions.

B.—Product Load

1. Type of products being refrigerated.
2. Temperature of products entering cooler.
3. Desired temperature of products for proper preservation.
4. Number of lights in refrigerated area.
5. Number of motors in refrigerated area.
6. Number of workmen in refrigerated area.

C.—Figuring the Total Heat Load

1. Heat leaks only.
 - a. Temperature difference times square foot of surface times K factor equals total heat load per hour in B.t.u.'s.
2. Product load only.

Table 3
Values Used in Estimating Heat Leakage

B.t.u. Per Sq. Ft. Per °F.	
1 in. cork or equal.....	K .28
2 in. cork or equal.....	K .14
3 in. cork or equal.....	K .09
4 in. cork or equal.....	K .07
5 in. cork or equal.....	K .06

Glass	
Single	K 1.13
Double	K .45
Triple	K .281

Motors

1/20 Hp.	2.96 per hour
1/10 Hp.	4.73 per hour
1/5 Hp.	5.68 per hour
1/4 Hp.	7.09 per hour
1/3 Hp.	18.97 per hour
1/2 Hp.	13.00 per hour

Lights

25 Watt Light.....3.42 x 25 = 85.5 B.t.u.

1 Watt

B.t.u.'s of Heat Generated Per Man Per Hour, Working at Different Temperatures

50° room .....	.684 B.t.u. per hour
40° room .....	.807 B.t.u. per hour
20° room	1.054 B.t.u. per hour

Product Load

25% of the heat leakage of a wall in cooler will give the average product load except for extreme cases.

- a. Weight times temperature difference times specific heat equals total B.t.u.'s.

3. Number of workmen in cooler.
 - a. Number of men times the heat generated per hour per man times the time in the box equals total B.t.u.'s.

4. Total heat load.
 - a. One plus two plus three equals four.

D.—Size of Condensing Units

1. Total refrigeration load per day.
2. Refrigerated temperature or suction pressure.
3. The best condensing medium available, air or water.
4. Condensing medium temperature.
5. Operating time of condensing unit.
6. Details of space available for location of condensing unit.
7. Ventilation of condensing unit space.

E.—Selecting Evaporators

1. Total load per day. Find equipment specified for load in manufacturers' catalogs.
2. Desired fixture temperature.
3. Refrigerant temperature or suction pressure.
4. Operating time of condensing unit.
5. Interior dimensions of fixture.
6. Details of.
7. Space available for evaporators.
8. Dimensions of doors through which evaporators will be passed for installation.

Bakeries Uses Refrigerators For Dough Storage

MINNEAPOLIS—Bakeries are becoming an increasingly good market for electric refrigeration because such facilities enable them to prepare their dough in advance and store it until needed, reports W. H. Snyder, commercial manager of O. F. Stuefer, Inc., here.

Mr. Snyder reports recent installation of a special bakery box in Unidale Bakery, St. Paul. The box is 11x7x3 ft., holds 196 trays for pastry dough, and is refrigerated with a General Electric E-17 "conditioned air" unit and a 1-hp. condensing unit.

TEMPRITE

INSTANTANEOUS
BEER and WATER COOLERS

Detroit

Michigan

Cleveland Meat Market Equipped by McCray

CLEVELAND—Said to be one of the most attractive meat markets in greater Cleveland, the Thomas Market, opened recently at 2287 Lee Road, is completely equipped with McCray commercial equipment sold by J. N. Bolton, Cleveland branch manager, and salesman A. P. Carnahan.

Equipment in the new store consists of one special cooler 10x12x11 ft.; one 1512 case and two 1510 cases, one 1610 case, five meat blocks (porcelain covered), and two fill-ins. McCray equipment was furnished for the com-

plete installation in the meat market.

Thomas Thomas, who has been in the meat market business for 40 years, took his problem to the McCray factory before purchasing the equipment. Engineers there designed his installation for him. The equipment is finished in white porcelain and Duralite with light green trim.

Designed specially for the store, the cooler and cooler partition at the back of the store are topped with attractive grille work. Green letters in a Duralite finish over the cooler spell out the name Thomas Market.

Mr. Thomas has installed a McCray P-151 cooler and several meat blocks in other markets.



THERE'S a decided thrill in being ahead of the field. - A jump ahead of competition because of superior performance. This thrill is born of a determination to be ahead and coordination of both mental and physical facilities.

Expressed in terms of the fitting business, manufacturers should have the desire to be ahead of demand, backed by the expert knowledge of the business which can plus the tremendous investment in manufacturing equipment which insures precision, uniformity, and moderate prices.

All these advantages are available to buyers of Commonwealth Fittings, the seepage-proof fittings "Built Right to Stay Tight". Twenty-six years specialization on the production of fittings for the refrigeration industry has made Commonwealth outstanding in this field. Close study of the industry's needs has dictated the building of forging plants, tool, die and pattern shops, as well as one of the largest batteries of automatic machinery ever assembled for the fabrication of brass. Every step of the way from the raw material to finished, inspected, trouble-free fittings is under the control and direct supervision of Commonwealth specialists.

Not only does Commonwealth excel in the production of standard type fittings, they supply thousands of semi-standard and special items made to order from sample, blue print or sketch.

Leaders in the industry, from the birth of automatic refrigeration, have relied on Commonwealth Brass Corporation as a preferred source of supply for Fittings "Built Right to Stay Tight."



**COMMONWEALTH
BRASS CORPORATION**
Commonwealth and G. T. R. R. DETROIT

Manufacturers at Memphis



Executives of parts manufacturing companies who attended the association's second annual convention in Memphis included: Top row—(1) P. C. Abbott, Wolverine Tube Co., Detroit; (2) C. P. Williams, Automatic Products Co., Milwaukee; (3) R. W. Johnson, president of Automatic Products Co.; (4) J. D. Colyer, Wolverine Tube Co. Bottom row—(1) A. J. LaGess, Hinsdale Mfg. Co., Chicago; (2) M. Swain, Zenith Carburetor Co., Detroit; (3) E. J. Zoll, Chicago-Wilcox Mfg. Co., Chicago; (4) H. W. Jarrow, Jarrow Products Co.

Displays That Invited Tests or Had Operating Models Were Popular at Memphis



(Left) Cutler-Hammer's exhibit was centered around a pair of operating displays, the first showing the flexing of the operating mechanism with the Cutler-Hammer control, and the second a stall-motor testing device, showing the free-tripping thermal overload feature of the units. Samples of its line of semi-commercial and commercial controls were also shown by the company.

(Right) Among the most novel exhibits at the show was that of Fedders Mfg. Co., which had actual

size equipment operating in miniature of various types of applications, such as display cases, residence air conditioning, etc.

Fedders equipment demonstrated in the various models (going from left to right in the photograph) included:

1. A Forcedraft unit cooler, connected in multiple with an ice cube maker refrigerator. To control the varying temperatures produced by these two kinds of cooling systems a snap-action valve and a check valve

were employed. Other Fedders equipment used: heat interchanger fittings, and a suction line strainer.

2. Three-piece multiple installation consisting of a brine tank, a sweet water bath, and a small refrigerator. The two high-temperature units, namely the refrigerator and the sweet water bath, both are controlled by constant pressure valves; check valves are used in the low-temperature portions of the installation.

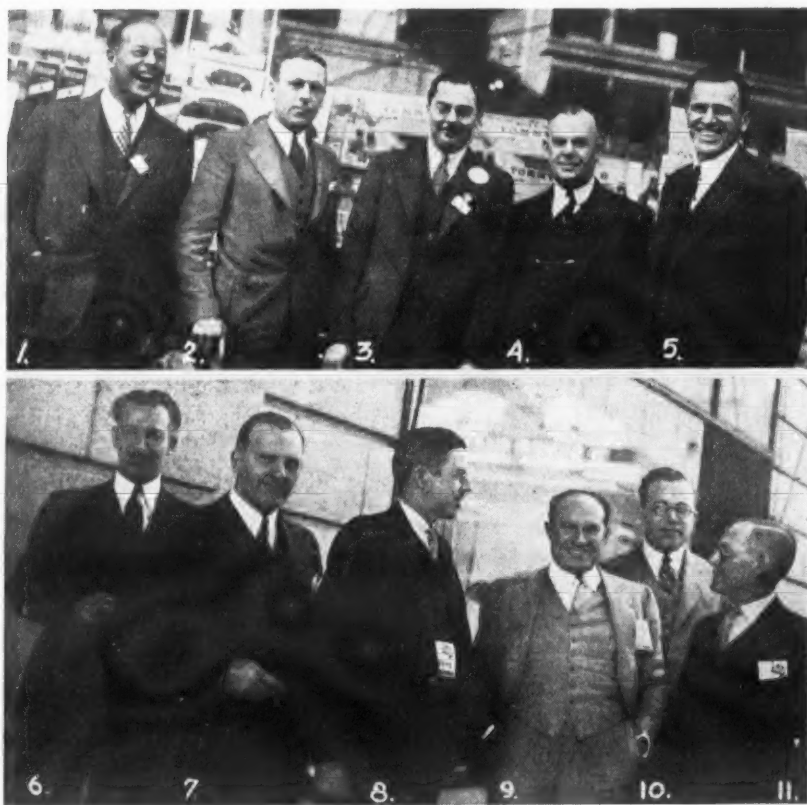
3. Two-piece multiple installation comprised of a sweet water bath, and

a coil for a refrigerated showcase. The showcase coil is a non-frost evaporator, and underneath it is the new Fed-R-Vex drain baffle. The high-temperature part of this hook-up (the non-frost evaporator) is controlled by a snap-action valve.

4. Air-conditioning installation in operation in "doll house" model. Both fresh and recirculated air are introduced into this model house. Below the house is a replica of a basement, in which a coil manifolded in the Fedders style is arranged in

front of a small blower. (A mirror placed below the coil enabled conventionites to actually see the dehumidifying process as the air passed over the coil. All other equipment in the exhibit was so lighted and arranged that working parts and recording instruments could be seen and studied to advantage.)

5. A liquid filter, automatic expansion valve, and a board on which the word "Fedders Quality" was spelled out on copper tubing covered with a frost-like substance.



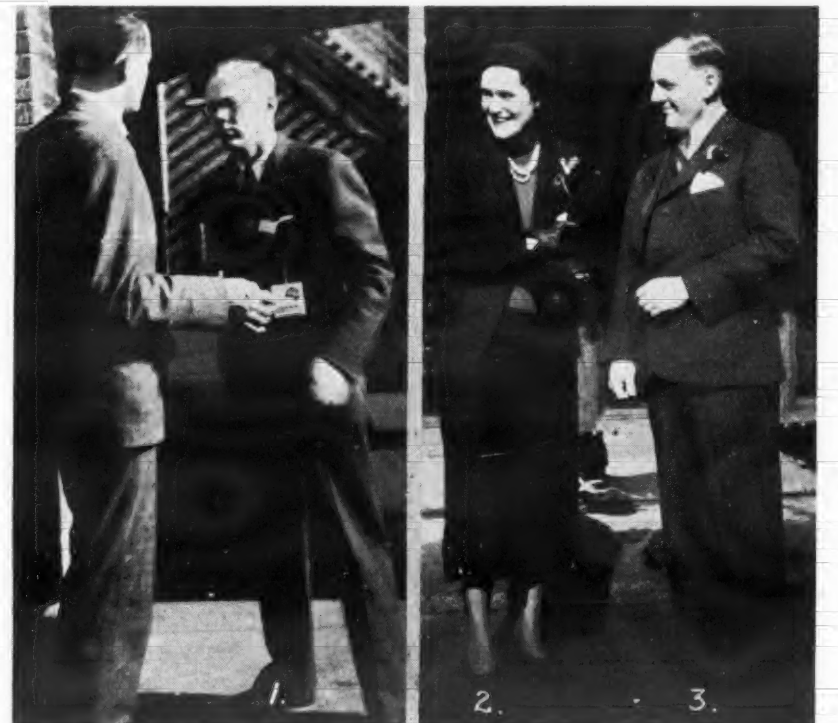
1. This fellow's big grin was an effective disguise. We couldn't recognize him. Can you? 2. Ed Terhune, eastern manager for Servel's commercial refrigeration division; 3. E. P. Sorenson, Airo Supply Co., Chicago; 4. G. C. Taylor, Kerotest Mfg. Co.; 5. E. J. Kimm, Kerotest Mfg. Co.; 6. W. F. Hancock, Refrigerating Engineering, Inc., Los Angeles; 7. J. D. Colyer, Wolverine Tube Co., Detroit; 8. J. D. Merkle, Ranco, Inc., Columbus; 9. D. H. Daskal, Perfection Refrigeration Parts Co., Chicago; 10. F. U. Webster, Cutler-Hammer, Inc., Milwaukee; 11. G. E. Graff, Ranco, Inc.

R.S.E.S. President



Paul Jacobsen (left), Chicago service engineer who was recently elected president of the Refrigeration Service Engineers Society, was presented with a wrist watch for his work as president of the Chicago chapter of the Society, at the last meeting of the Windy City chapter prior to the national convention at Memphis. Herman Goldberg (right) of Standard Refrigeration Parts Co. made the presentation.

Supply Jobbers and Parts Manufacturers Exchange Ideas at Twin Conclaves

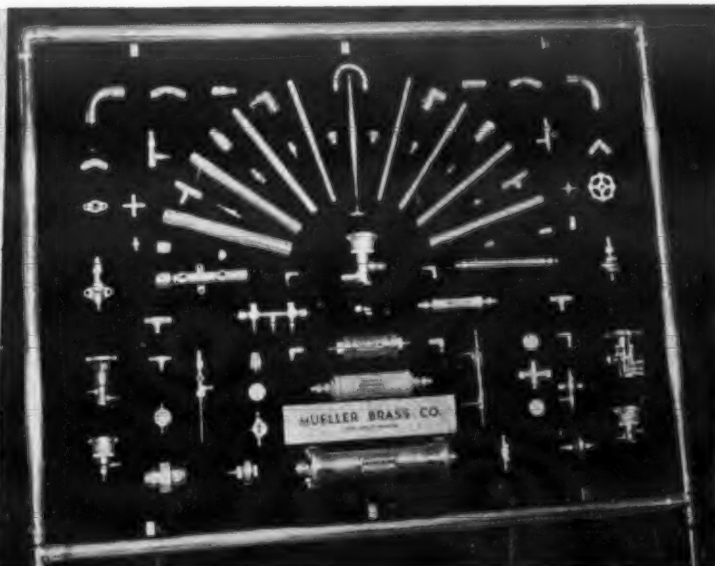


(1) H. W. Small of Thermal Units Co., Inc., St. Paul, in an earnest discussion of distribution problems with a fellow jobber. (2) Austin Jones, who represented United Supply Co., Omaha, at the jobbers' meeting, was accompanied by his sister, who takes an active part in the company's affairs. Miss Jones is pictured here with (3) J. D. Colyer of Wolverine Tube Co., president of the manufacturers' association.

Amazing Variety of Parts & Equipment Used by Service Engineers Exhibited at Recent Convention



Henry Valve Co.'s display booth showed its line of dryers, strainers, large line valves up to 6 inches, service tools, and wing cap valves, especially designed for use with Freon.



Mueller Brass Co. displayed its complete line of compression, shut-off, and two-temperature valves; brass, bronze, and copper fittings, strainers, and dehydrators, brass and copper tubing.



Zenith, a newcomer to the domestic field after two years experience in commercial refrigeration, displayed its complete line of filters for both domestic and commercial applications.

Great Variety of Products and Tools for Service Work Exhibited at Memphis



United Refrigerator Supply Co., Memphis jobber, displayed several of the products it stocks, including Ranco controls, Virginia Smelting Co. refrigerants, Henry valves, Kerotest valves and fittings, Gilmer belts, and United Wire & Supply Corp. tubing.

Snap-On Tools exhibited a refrigeration service set, composed of wrenches and small hand tools designed especially for refrigeration work. Their standard line covers complete ranges in all types of socket, boxsocket, and open end wrenches.

Virginia Smelting Co.'s display centered around a series of gauges and testing apparatus used in making moisture analysis of its "Extra Dry Esotool" sulphur dioxide. A board at the right demonstrated efficiency of the company's "Drierite."

Wang Presents Complete Data On Estimating Equipment for Refrigerated Trucks

MEMPHIS, Tenn.—Complete data on estimation of equipment for both low and high-temperature refrigerated truck applications, with special consideration for the problems peculiar to truck refrigeration, were presented by G. D. Wang, field engineer in Milwaukee for Copeland Refrigeration Corp., at the Thursday afternoon technical session of the R.S.E.S. Convention here last week.

There are three component parts to a mechanically refrigerated truck, said Mr. Wang, and they are: (1) the body, (2) the low side or evaporator, and (3) the high side or condensing unit. He discussed these factors as follows:

Body

Use of a refrigerated truck body is subjected to a very great physi-

cal strain on the highways and construction demands considerations different from those in the construction of a stationary job. The road shocks and vibration that set up on a truck body can result in very inefficient performance after operation but a short time.

One very important factor to take into consideration in truck bodies is moisture in the insulation. In figuring equipment for old bodies, careful inspection should be made to determine if moisture is present in the insulation.

In figuring a truck body job insulation values and construction of the body are factors. There are a number of insulations on the market with varying thermal conductivity values, or "K" factors, as shown in

Table 1

Balsa Wood	.....380
Corkboard	.....300
Celotex	.....340
Insulite	.....340
Rock Wool	.....280
Mineral Wool	.....310
Hair Felt	.....246
Kapok (Dry-Zero)	.....240
"Rock Cork"	.....328
Balsam Wool	.....270
Flaxlinum	.....328
Palco Bark	.....258

The "K" factor shown is in B.t.u.'s per square foot per inch of thickness, per degree F., difference in temperature on the opposite sides, per hour. Taking corkboard, which has a "K" factor of .300 per inch, as an example, it will be found that in using 6 inches of cork insulation it is necessary to have the "K" factor of .300 divided by 6, or a .05 B.t.u. heat transfer through 1 sq. ft. of 6-inch thickness of corkboard.

As the human element enters into the construction of a body, the construction will not be 100% perfect. Therefore a 10% construction heat loss must be added.

Evaporators

The low side, or evaporator, is either a direct or an indirect system. The direct systems have been made up mainly of bare coils. The indirect evaporators are most generally used and consist of plates with coils on the inside using a eutectic solution.

These plates act as a storage battery storing up refrigeration, and are made up in standard sizes by manufacturers who make a specialty of manufacturing holdover plates.

Refrigeration capacities of the plates have been calculated by the B.t.u.'s removed from the eutectic solution, plus the square foot area of the plates. A pre-determined eutectic point is determined. The sensible heat is extracted down to the pre-

determined eutectic point. From there on the number of B.t.u.'s per pound is extracted until the eutectic solution becomes entirely solidified and becomes flint hard.

Calculations have varied regarding the amount of B.t.u.'s per pound of latent heat extracted, the range being from 105 B.t.u.'s to 136 B.t.u.'s per pound from a eutectic point of -8° F.

To be safe the service engineer should figure that there are 105 B.t.u.'s of latent heat extracted per pound of eutectic solution.

A standard holdover plate using eutectic solution when completely solidified will have a rating of approximately 8,200 B.t.u.'s. A correct eutectic solution must have a constant eutectic point.

By far the best practice is to use only holdover plates manufactured by manufacturers who have had experience with eutectic solutions, and who can provide hourly heat load ratings in B.t.u.'s for their size plates. Attempts to manufacture your own holdover plates or tanks and using your own eutectic solution formulas may prove to be a very costly experience.

Condensing Units

Condensing units can either be installed on the trucks or remote in the garage.

The units on the trucks can be run either by electric motor on the unit, a gas engine unit, or a power take-off.

Selection of any of these methods depends upon the conditions of where the trucks are being used. The units that are remote are either individual units for each truck, or one large unit for a fleet of trucks. More care has to be exercised in the remote units as the human element enters into the connecting and disconnecting of the refrigerant lines.

In calculating the capacities of the condensing unit it is necessary to consider the number of hours that the truck will be idle. Capacity of the condensing unit has to be large enough to remove all the heat units in the time that the truck is idle, with enough additional capacity to allow for any unforeseen delay. A condensing unit should be large enough to completely pull down in 10 hours.

(Concluded on Page 18, Column 1)

Table 2—Data Sheet on Truck Installation

Name of user: Withheld.

Address..... City..... State..... Phone.....

PRODUCTS AND TEMPERATURES DESIRED:

Products to be hauled:Ice cream. Amount:300 gallons.

Temperature desired in truck: 0° F. Minimum low: -10° F. Maximum high: 5° F.

Temperature of products entering body: -10° F. Time of day, A. M.: P. M.: 6:00.

If perishable foods, give lowest temperature allowable:

SERVICE CONDITIONS:

Way products are shipped:2½ gallon metal and paper cans.

Dimensions of containers:10½ inches high x 10¼ inches in diameter.

Will truck be used for city delivery:yes. Cross country hauls:no.

Daily mileage: Number of stops:60. Average time at stops:5 minutes.

Number of times doors open:60. Average time each opening:2 minutes.

Hours truck will be away from plant at one time:10 hours.

Time leaving plant:7 A. M. Time returning:5 P. M.

Maximum high outside temperature:100° F.

Average outside temperature around body at night pull-down:70° F.

Give any other condition body will be subjected to:Surplus ice cream checked in,

and truck reloaded with ice cream for next day's delivery before pull-down.

METHOD OF REFRIGERATION:

Unit installed on truck:No. Remote:Yes. Gasoline engine:No.

Motor takeoff:No. Make of unit:Withheld. Model:

Refrigerant used:Methyl. Air cooled:No. Water cooled:Yes.

Motor size:¾ Hp. Kind of electric current A.C.:Yes. D.C.:No.

Volts:220. Cycle:60. Phase:1.

Truck chassis:Yes. Trailer:No. Semi-trailer:No.

Inside dimensions—Length:87 inches. Width:59 inches. Height:40 inches.

Insulation thickness—Floor:6 inches. Walls:6 inches. Roof:6 inches.

Kind of insulation—Floor:Cork. Walls:Dry-Zero. Roof:Dry-Zero.

Outside dimensions—Floor:99x71 inches. Sides:99x54 inches.

Outside dimensions—Ends:54x71 inches. Roof:99x71 inches.

Number of doors on curb side:Two. Size:26x22 inches.

Number of doors on street side:None. Size:

Number of doors on rear:One. Size:30x22 inches.

Describe any other features:Supports built in body for hold-over plates.

.....

If body now in use, built by whom:New. Age: How refrigerated:

Condition of insulation—Good: Fair: Poor:

Condition of doors and gaskets—Good: Fair: Poor:

Describe inside partitions and supports, and if removable:

.....

Use sketch shown on this page to show location of doors, offsets in floors, partitions,

and any other special features.

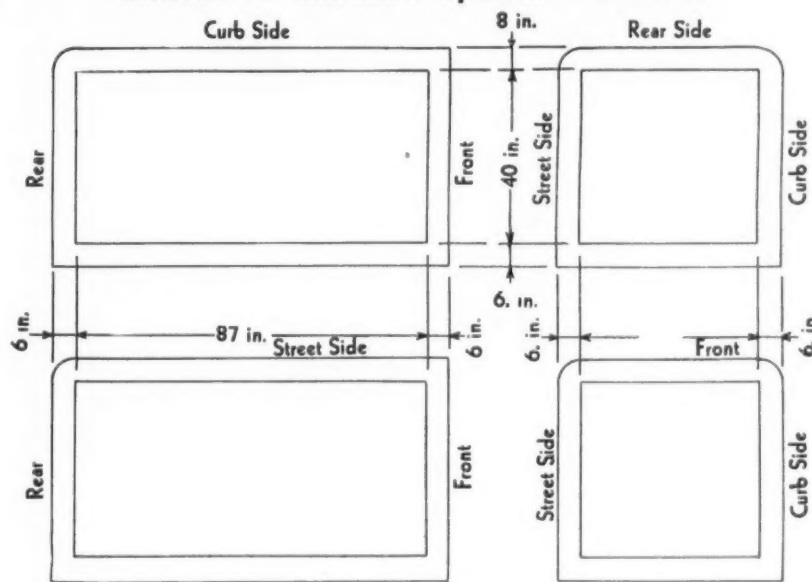
Dealer of truck mfg. Submitted by:

(firm) (firm)

By By

Title Title

Sketch to Indicate Special Features



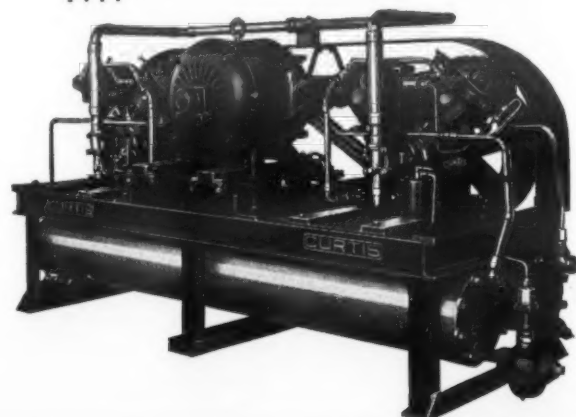
This sketch is an integral part of Table 2, and is to be used to show location of doors, partitions, and other special features.

DEPENDABLE

PERFORMANCE

— LESS SERVICE,

More Profit



CURTIS

CURTIS REFRIGERATING MACHINE CO.

Division of Curtis Manufacturing Co.
1912 Kienlen Ave., St. Louis, U.S.A.

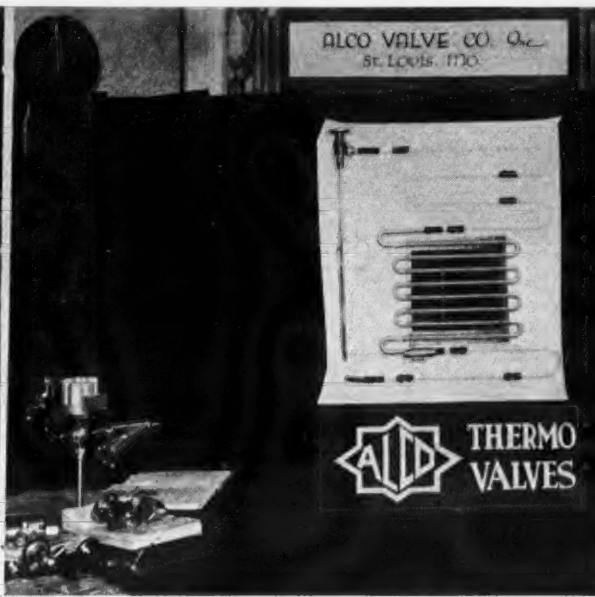
● No matter what the manufacturer's guarantee, there is no profit in service calls. Furthermore, necessity for service calls makes dissatisfied customers.

The solution is dependable performance—the kind you get from the condensing units made by Curtis. Year in and year out, Curtis units perform quietly, economically, efficiently. You'll have satisfied users, if you specify Curtis equipment, and that means more profit. The Curtis name and the Curtis product have been dependable since 1854.

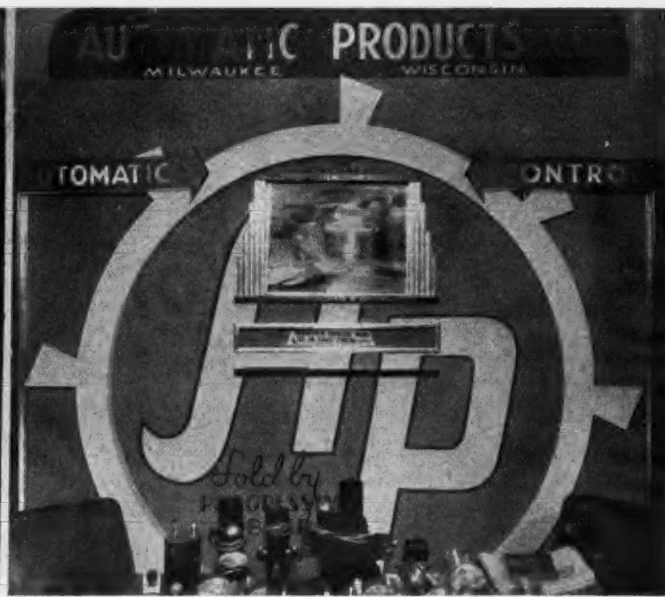
Service Men Shown Operation of Expansion Valve in Feeding Glass Evaporator



Airo Supply Co. showed its representative line of replacement parts, including: Perfection replacement parts, Torrey valves, Hinsdale tools, a complete display of gaskets, and other products. A glass case on one side of the booth contained four turtles, for which a \$10 prize was offered to the person who spied them lined up to spell the word "Airo." There were no winners. Periodic drawings of registration names were also made, the winners receiving U. S. Gauge Co. auto compasses.



Center of Alco Valve Co.'s display booth was a glass evaporator and transparent valve assembly, the former designed to show the rate of feed from the thermostatic expansion valve as constant with the use of the company's product, instead of spasmodic. The transparent valve was designed to show its internal construction, and the flow of refrigerant.



Automatic Products Co., in a colorful exhibit, showed its line of expansion valves, pressure valves, thermostats, and solenoid valves. Background of the company's booth was a rotating display of color-pictures of its products, which swung into position automatically. Two new products shown were Model 205 thermostatic expansion valve and Model 206 automatic expansion valve.

Refrigerated Truck Service Complaints Are Discussed

(Concluded from Page 17, Column 5)

All condensing unit manufacturers have their condensing units rated in B.t.u. per hour. By consulting their specifications the size of condensing unit to be used can be determined.

In order to figure the refrigeration for a truck body it is necessary to obtain complete correct data. Tables 2 and 3 represent a data sheet that has been used on a specific truck that has been manufactured, and provides the information that is neces-

sary to calculate the necessary equipment.

It should be remembered that the most important part of truck refrigeration is the temperature of the truck when it returns to its loading point. The temperature of the truck when it returns must not be higher than the maximum high temperature desired as it would spoil products. Therefore, particular attention must be given to the temperature in the truck bodies at the time that they return and up to the time they are to be pulled down.

One major service complaint encountered was that trucks would return with spoiled provisions, as the temperature had gone up 10 to 15° above the safe maximum temperature. Upon investigation it was found that the truck had been a

built-over ice and salt body and that the manufacturer who rebuilt the body did not have enough insulation in the bottom of the truck body, consequently the heat filtration through the bottom brought the temperature too high and resulted in the ice cream becoming soft.

Another type of service complaint was where the truck body pulls down very fast and low. The truck body was well insulated and showed no traces of abnormal heat losses. The condensing unit was of more than ample capacity. Further investigation showed that a eutectic solution was being used in the hold-over plates which had not been tried before.

For high temperature truck bodies follow the same method except that the products carried at temperatures above freezing are generally warmer when they are loaded than the temperature desired in the truck. This

naturally would increase the refrigeration load.

To figure this addition in load multiply the weight of products in pounds by the specific heat of the products. Then multiply this result by the number of degrees the temperature needs to be lowered. As an example: 1,000 lbs. of lean beef at 50° F. put in a truck at 38° F. would add 1,000 x 0.77 x 12 = 9,240 B.t.u. to the service load.

On another job it was found that the condensing unit that was on the truck had a B.t.u. rating of ample capacity to handle this job, but a careful check of this unit disclosed that the condensing unit did not have the ability to pull out the B.t.u.'s from the eutectic solution to completely solidify the solution in the time that it had to operate.

This was remedied by installing another condensing unit that had a size smaller motor with a compressor of greater efficiency in low temperatures.

New Distribution Setup Clears Way in East for Birdseye Campaign

NEW YORK CITY—Solution of many distribution and production problems cleared the way for the extensive advertising campaign which Birdseye Frosted Foods Corp., subsidiary of General Foods Corp., instituted recently in five eastern cities.

New York, Boston, Philadelphia, Rochester, and Newark are being covered, mainly through the medium of newspaper advertising.

A similar campaign, launched in Boston in 1931, was cancelled because of inability to secure adequate distribution.

At that time dealers were required to make investments ranging from \$800 to \$1,500 for refrigerated cases in which to store and display the Birdseye products. Now, however, arrangements have been made to lease these at about \$12 a month.

Super-Cold Replaces Old Ammonia System

CATHLAMET, Wash.—An 8 x 10 Super-Cold display case and condensing unit was recently installed in the Columbia Market, operated by T. E. Lehman, replacing a single-glass case and ammonia refrigerating equipment formerly used.

The sale was made by Bart Davidson, commercial sales manager for Marshall Refrigeration Co., Longview, Super-Cold distributor.

Table 3—How to Figure Truck Refrigeration

Inside dimensions of body—Length:	87 in.	Width:	59 in.	Height:	40 in.
Insulation—Floor:	6 inches cork.	Sides:	6 inches Dry-Zero.		
Insulation—Ends:	6 inches Dry-Zero.	Roof:	8 inches Dry-Zero.		
Product to be carried:	Ice cream.				
Hours in service:	10 hours.	Temperature difference:	90° F.		
Number of door openings:	60.	Average time:	2 minutes.		
Floor	Inside length 87 in. plus 12 in. (insulation two walls) = 99 in.				
	Inside width 59 in. plus 12 in. (insulation two walls) = 71 in.				
	(Outside length) 99 in. x (outside width) 71 in. ÷ 144 =				
	48.8 sq. ft.				
Roof	Inside length 87 in. plus 12 in. (insulation two walls) = 99 in.				
	Inside width 59 in. plus 12 in. (insulation two walls) = 71 in.				
	(Outside length) 99 in. x (outside width) 71 in. ÷ 144 =				
	48.8 sq. ft.				
Sides	Inside length 87 in. plus 12 in. (insulation two ends) = 99 in.				
	Inside height 40 in. plus 14 in. (insulation floor & roof) = 54 in.				
	(Outside length) 99 in. x (outside height) 54 in. ÷ 144 x 2 =				
	74.3 sq. ft.				
Ends	Inside width 59 in. plus 12 in. (insulation two walls) = 71 in.				
	Inside height 40 in. plus 14 in. (insulation floor & roof) = 54 in.				
	(Outside width) 54 in. x (outside height) 71 in. ÷ 144 x 2 =				
	53.2 sq. ft.				
Total Outside Area	225.1 sq. ft.				

HEAT LEAKAGE

For 1° temperature difference
 Floor area 48.8 sq. ft. x .05 B.t.u. = 2.440 B.t.u. per hour
 Roof area 48.8 sq. ft. x .03 B.t.u. = 1.464 B.t.u. per hour
 Sides area 74.3 sq. ft. x .04 B.t.u. = 2.972 B.t.u. per hour
 Ends area 53.2 sq. ft. x .04 B.t.u. = 2.128 B.t.u. per hour
 Total B.t.u.'s per hour 1° temperature difference = 9.004 B.t.u. per hour
 Add 10% for construction allowances = .900 B.t.u.
 Total B.t.u. load per hour 1° temp. difference = 9.904 B.t.u.

TEMPERATURE DIFFERENCE 90°:

90° (temperature difference) x 9.9 B.t.u. = 891 B.t.u. per hour.
 891 B.t.u. x 10 (truck on road 10 hours) = 8,910 B.t.u.
 60 door openings at 2 minutes each = 120 minutes or 2 hours.
 891 B.t.u. x 2 hours = 1,782 B.t.u. x 2 (twice normal load) = 3,564 B.t.u.
 891 B.t.u. x 14 (day over period 14 hours) = 12,474 B.t.u.
 Total B.t.u. for 24 hours for 90° temperature difference 24,948 B.t.u.

Table 4—Specific Heat

Name	Per Cent Water	After Freezing	Before Freezing	Latent Heat of Fusion
Apples	83	...	0.92	...
Beef, Lean	72	0.41	0.77	102
Beef, Fat	51	0.34	0.60	72
Berries	...	...	0.42	...
Butter, Tubs	...	...	0.55	...
Cabbage, Bulk	91	0.43	0.93	129
Carrots	83	0.45	0.87	113
Cheese, Cream	...	...	0.64	...
Cream, Fresh	59	0.38	0.90	84
Eggs, Storage	70	0.40	0.76	100
Eggs, Freezing	70	0.40	0.76	100
Fish, Freezing	73	0.43	0.82	111
Ice Cream, Freezing	67	0.45	0.78	90
Milk, Fresh	88	0.47	0.90	124
Mutton, Chilling	...	0.67	0.81	100
Oysters, Shell	80	0.44	0.84	114
Pork, Chill	...	0.30	0.51	55
Poultry, Freeze	74	0.42	0.80	105
Tomatoes	94	...	...	...
Veal	63	0.39	0.70	90

New Refrigeration Cuts Bad Beer Losses

NORTH BERGEN, N. J.—Electric Products, Inc., York distributor in this territory, recently installed a 3-hp. water-cooled York Freon compressor and four model 100 York chillers for South Bergen Distributors, Inc., East Rutherford, N. J.

This equipment is used to chill 1,600 barrels of beer down to 40° F. within 24 hours. The beer is then delivered immediately to local dealers. As a result of this installation, returns of bad beer have been reduced considerably, the distributor reports.

Electric Products, Inc. has installed 240 commercial refrigeration machines since the first of the year. About 40% of these installations were replacements of old sulphur dioxide and ammonia plants.

Service is rendered to approximately 4,000 commercial users in this territory by Hudco Refrigeration Engineers, Electric Products subsidiary which operates as an independent company.

Com'l Equipment in Demand By Southern Dairies

MONTGOMERY, Ala.—Demand for electric refrigeration by dairies and milk plants in the south has tripled in the past two years, according to O. K. Hogan, secretary-treasurer of Acme Feed & Fuel Co., Lipman distributor here.

Owners of dairy herds are finding they can save money by having ample refrigeration, Mr. Hogan said. The company has its own engineer, to supervise installations.

McCray Units Installed In 3rd Store of Chain

CIRCLEVILLE, Ohio—Installation of McCray commercial equipment in two stores operated by Gerhardt Bros. & Morrison proved so business-building a proposition that the company similarly outfitted a third store recently opened here.

Complete with McCray machine equipment, the installation in the Circleville store includes a P-151 cooler, 8x6x9 ft. 4 in., one 1512 case, and one F-6 case complete with an 112 condensing unit.

First of the Gerhardt Bros. & Morrison stores in which McCray equipment was installed was in Mt. Sterling, Ohio. An M-10 case was first purchased, then a P-151 cooler, 8x6x9 ft. 4 in.

The second store, opened at Asheville, had a P-110 case with refrigerator. Later, a cooler was installed refrigerated with a McCray unit 7x5x10 ft.

B. J. Gossage, of the manufacturing company's Columbus branch, sold the Circleville equipment.

Bulletin Describes Line Of Cameron Pumps

NEW YORK CITY—Cameron Pump Division of Ingersoll-Rand Co. recently issued a bulletin containing a complete description of manufacturing methods, features, and applications of its line of coupled pumps.

These pumps are suitable, the bulletin states, wherever liquids are pumped. They are designed for capacities from 150 to 5,000 g.p.m. against heads between 20 and 250 ft.

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Refrigeration and Air Conditioning

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* THESE FEATURES ARE ALL COVERED UNDER U.S. PATENT GRANTED OCT. 1, 1936 AND OTHER PATENTS APP. FOR

Hoesel Discusses Ten Factors Essential to Proper Figuring Of Air-Conditioning Jobs

MEMPHIS, Tenn.—Step-by-step procedure in estimating the equipment needed for a satisfactory comfort cooling installation was described by A. F. Hoesel, Peerless Ice Machine Co., Chicago, in his paper on "How to Figure An Air Conditioning Job," presented before the Thursday afternoon technical session of the annual R.S.E.S. convention here last week.

"How much cooler should the occupied space be as compared with outside conditions of temperature," is one of the first considerations of the air-conditioning engineer, declared Mr. Hoesel. While the customer believes air conditioning should be apparent by the use of comparatively low temperatures, the engineer realizes that the best system of air conditioning is that one which does not intrude itself upon the consciousness of those within the air-conditioned space, Mr. Hoesel said.

"A good average temperature differential, as between the inside and outside of an air-conditioned space, would be 72° F. inside temperature for 75° F. outside temperature, and for every 5° F. increase in outside temperature increase the inside temperature by 2° F.," Mr. Hoesel explained.

"These are dry bulb temperatures. For any certain inside dry bulb temperature, the wet bulb temperature should be 10° F. lower.

"From the above we find that, with 95° F. outside dry bulb temperature, we would have an inside dry bulb temperature of 80° F. and a wet bulb temperature of 70° F.

Heat Load First Problem

First problem with which the installation engineer is concerned is the heat load of the job, said the Peerless chief engineer. In order to have a 100% job, it becomes necessary to divide this heat load into its proper proportions of sensible and latent heat loads; the sum of the both being the total heat load.

The sensible heat load comprises the heat given off directly by warm surfaces, such as walls, floors, and ceilings of the space, the human occupants, lights, motors, and other appliances in the space, all of which are at a higher temperature than that of the cooled space.

To this must also be added the sensible heat load of the necessary fresh air introduced into the cooled space and for the purpose of eliminating odors and keeping the air, within the cooled space, fit for breathing.

The latent heat load comprises the reduction in moisture content of the fresh air and the recirculated air.

Principles of Heat Load

Mr. Hoesel discussed the broad principles involved in heat loads step by step, pointing out that by the use of these principles and the necessary data, it is possible to calculate the characteristics and capacity necessary for a cooling system to satisfy the demands of a given job.

Mr. Hoesel enumerated the principles involved as follows:

1. The technical tables and data necessary to assign the correct values to varying conditions comprise a psychrometric chart, a heat leakage table for the various types of construction encountered, a table of heat loads due to various appliances, a table of average sensible and latent heat of occupants, and the mean July temperatures of the particular locality of the conditioned space.

Boundary Surfaces

2. The boundary surfaces, of the cooled space, are broken down into the various areas, which are of common construction and having the same heat transfer through their surfaces.

For instance: if the problem was to find the heat load for a dining room in the corner of a large building, there would be an outside wall of a certain type of construction, an inside wall of probably a different type of construction, a front wall of which the major area would be comprised of glass, a rear wall separating the kitchen and dining room—and of entirely different construction than any of the other three walls, a floor and ceiling each of which might differ from the other.

Thus the engineer is confronted with six boundary surfaces each of different construction, having differ-

ent rates of heat transfer and some having greater temperature differences, between inside and outside, than the temperature differences of the other boundary surfaces. Some of them may be exposed to sun effects which materially increase their heat transfer.

In this particular case, it would be necessary to calculate each area separately and then multiply each area by its correct heat transfer value for the maximum difference desired between the outside temperature and the inside temperature, not forgetting any possible sun effects.

Sum of the heat transfers of these individual areas is the amount of B.t.u. heat leakage through the boundary surfaces.

Load from Appliances

3. Next step is to determine the number and size of the various lights, motors, steam tables, coffee urns and other appliances which will be within the cooled space. Assigning the proper heat loss, determined from the appliance heat loss chart, and summing up the same, gives the load of all the appliances.

4. Next determine the maximum number of persons, who will be within the cooled space at one time, and if necessary split them into active and non-active groups. Each group shall then be multiplied by the proper sensible and latent heats for a person within that particular group under the particular conditions of inside temperature. Summing these up separately provides a human heat load comprised of both sensible and latent heats, which should be kept separated for purposes to be explained later.

Each person requires a certain minimum amount of fresh air, which in some localities is prescribed by ordinance. If any ordinance prevails, then multiply the maximum number of persons by the required quantity of air in c.f.m. according to the ordinance, which will give the total quantity of fresh air in c.f.m. Always remember that, where heavy odors are present, it is well to be sure that enough outside air is taken in to overcome them.

Fresh Air Introduced

5. The fresh air introduced into the cooled space has two separate heat loads. One is the sensible heat and the other is the latent heat. From the amount of air necessary, as determined according to "4" above, and the psychrometric tables mentioned previously, are determined the B.t.u. values of the sensible and latent heat loads. Keep these separated.

6. Now add up separately the sensible and latent heat loads of 2, 3, 4, and 5 above and thereby determine that a cooling unit of a certain sensible heat capacity and a certain latent heat capacity, under the conditions of the entering air mixture, will provide the proper capacity for the design conditions.

Automatic Controls

7. Since the cooling unit is designed for a certain minimum capacity, and the heat load being lighter at certain periods, the installation engineer is now confronted with the problem of controlling the capacity of the cooling unit, with at least some semblance of relation to the heat load.

An absolutely automatic system, responsive to all variations of conditions, involves the use of a large number of instruments, which are practically unwarranted except in large installations.

For most small jobs, a close differential thermostat, starting and stopping the compressor with variations in temperature of the cooled space,

will prove sufficient, although a differential thermostat, which controls the inside dry bulb temperatures in accordance with variations of outside dry bulb, will undoubtedly prove more satisfactory since it obviates the necessity of manual adjustment of the room type thermostat according to variations of outside temperature.

While the humidity conditions under the above methods of control will vary, these variations may be disregarded in the smaller types of installations, where the complexity of control necessary to maintain all conditions would prove too costly.

For more accurate control, wherever necessary, consult the manufacturers of the equipment for their recommendations.

Necessary Duct Work

8. Next problem is the consideration of the necessary duct work, if any, to carry the cooled air to the various points of discharge into the cooled space, and the duct work, if any, necessary to return the heated air to the cooling unit.

From the standpoint of efficiency in operating and initial costs, square ducts, of equivalent area, are to be preferred to wide shallow ducts.

In many cases, due to surrounding conditions, wide shallow ducts blend into the surroundings much better and should then be employed. Do not make the duct sizes too small since this will either increase the necessary fan horsepower for a given c.f.m. air circulation or else result in an air circulation of smaller c.f.m. than contemplated.

Location of Grilles

9. Supply grilles should be placed as high as possible, allowing at least one foot below ceiling wherever possible.

In order to avoid drafts, where the air throw is not too great, it is advisable to use long grilles of small height since the cooled air will diffuse more readily with the room air. A common mistake is to use too few grilles and depend upon a high volume discharge, at a few places, to sufficiently agitate the air to provide circulation at remote points. This is not the best practice if it is possible to use smaller and more outlet grilles.

Return grilles should be placed near the floor line, where practicable.

Cleaning the Air

10. Air filters are a requisite to a real air conditioning job. Many different types are available and it becomes a matter of choice as to which shall be selected. The total amount of filter area, on a given job, should be kept as large as possible, consistent with the available space, in order to overcome the necessity of too frequent cleaning or renewal. It might be well to mention here that neglect to clean or renew filters, whenever necessary, results in a decreased capacity of the cooling system.

Order of Calculation

Calculations, pointed out Mr. Hoesel, are best made in the order shown in the table below.

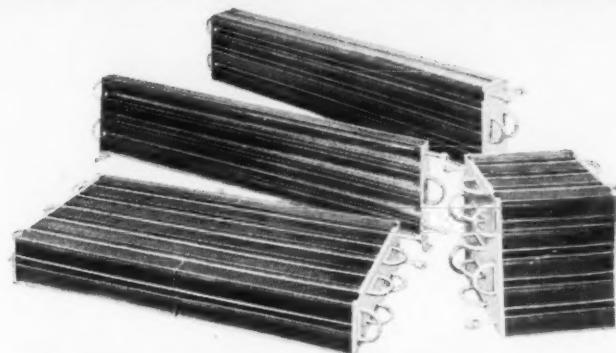
"In many cases," warned Mr. Hoesel, "the contractor will purchase cooling units and compressors from different sources of supply and connect them on the job; therefore, a word of caution, regarding suction line sizes.

"Do not use suction lines which, due to the small size of same, impose a large pressure drop between the cooling unit and the compressor. This will result in a decreased capacity of the entire system and in some cases might be serious enough to give the entire job a 'black eye.'

"If for any reason—such as too small suction lines, too large a compressor, or cooling unit slightly under capacity as compared to the compressor capacity—the suction pressure is lower than the job is originally calculated for, do not decrease the compressor speed in order to carry higher suction pressures, without checking the job thoroughly to find out the cause of the decreased suction pressure and then determining whether or not such change will improve the operation, or be justified."

The Buyer's Guide

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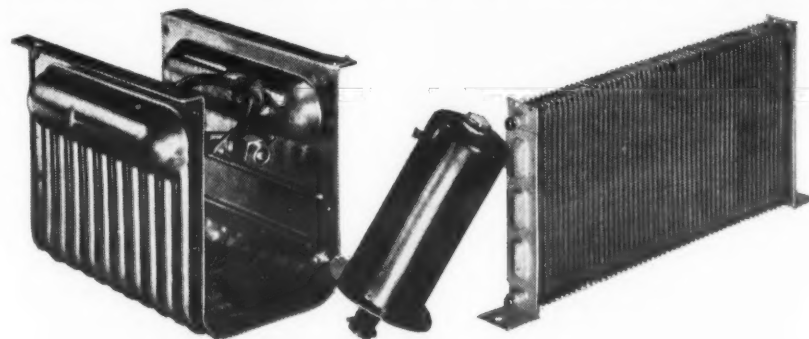
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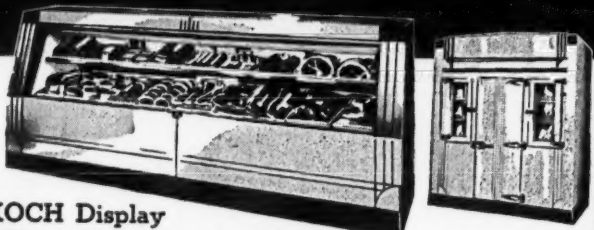
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Order of Calculation of Heat Load Factors

	Sensible Heat	Latent Heat
a. Transmission gain in B.t.u.'s per hour.....		
b. Sunlight gain in B.t.u.'s per hour.....		
c. Other sources of heat gain.....		
Occupancy in B.t.u.'s per hour.....		
Electric load in B.t.u.'s per hour.....		
Appliance load in B.t.u.'s per hour.....		
d. Outside air heat gain in B.t.u.'s per hour.....		
The total refrigeration load is the sum of all sensible heat and all latent heat.		
To express this in tons of refrigeration effect, we divide this sum by 12,000 B.t.u., which is the standard rating of heat removal per hour per one ton compressor and/or cooling unit capacity.		

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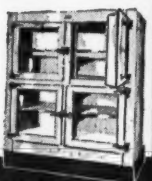
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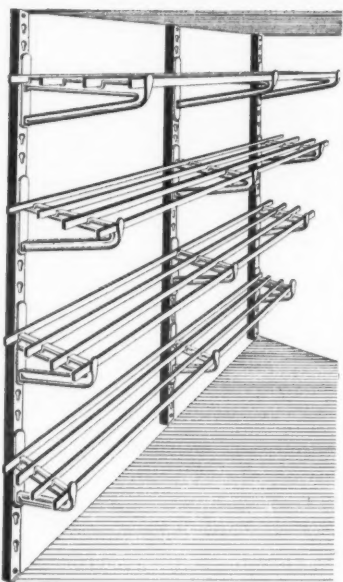
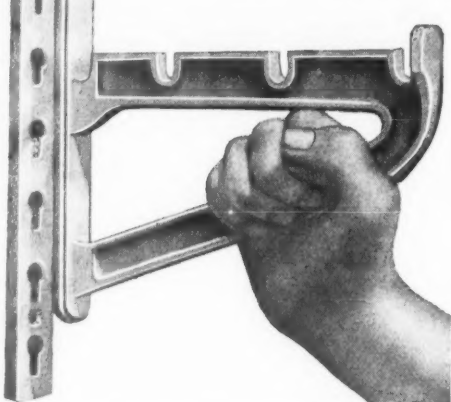
Write for full information, stating qualifications



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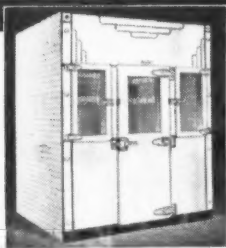
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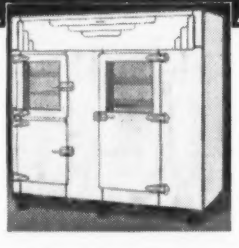
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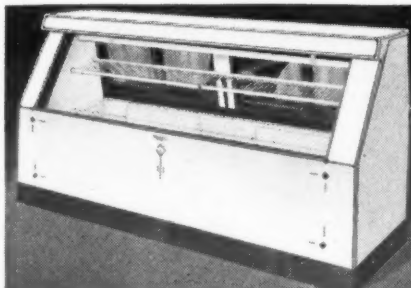
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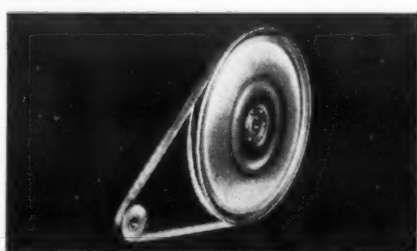
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Air Conditioning

Climax Machinery Co. Introduces Five Self-Contained Models for Summer Air-Conditioning Markets

INDIANAPOLIS—Climax Machinery Co. is introducing to the 1937 summer air-conditioning market a line of five self-contained models with net refrigerating capacities from 2,503 to 12,980 B.t.u. per hour, designed for installation in store, home, or office.

The units are developed on a "five-point" principle of air conditioning: refrigeration, dehumidification, circulation, filtration, and ionization.

Cabinets, of walnut construction, are designed as additions to the furniture of home or office. Operating parts are of standard make, for easier servicing by dealers and service men. These include Wagner motors, Chieftrain compressors, Fedders evaporators, Detroit Lubricator expansion valves, and Electromatic water valves.

The unit differs from most self-contained conditioners in that the refrigerated air is discharged from the front of the cabinet, thereby concentrating its efficiency on the lower strata of the room. Evaporator is close-finned, for more efficient dehumidification without drastic temperature reduction.

Circulation is accomplished by means of fans operating through the front of the cabinet. Two stationary fans are on these three larger models; the smaller units have an oscillating fan. Air is drawn into the unit through a filter located at the back,

where dirt, dust, and pollen are removed.

An ionizing device oxidizes all impurities in the air, turning them into solid matter which may be picked up by the filter. If desired, the unit may be operated in winter with only filtering and ionization devices operating.

Model 20, smallest of the five, has dimensions 32x16x38 inches. It is equipped with a 1/4-hp. motor, water-cooled condenser and compressor head, and one 10-inch 1/16-hp. oscillating fan. Freon is the refrigerant used in all models. The unit has a refrigeration capacity of 2,503 B.t.u. per hour.

Model 30, similar in size to Model 20, has 1/2-hp. motor and 1/16-hp. 10-inch oscillating fan. Capacity of the unit is 6,379 B.t.u. per hour.

Model 30 Deluxe has a cabinet 33x19x36 inches, the same size motor as Model 30, but has two stationary 1/16-hp. 10-inch fans. Refrigeration capacity is 7,045 B.t.u. per hour.

Model 40 has a cabinet 37x21x45 inches, equipped with a motor of 3/4-hp. size, two 1/16-hp. 12-inch stationary fans, and a net refrigeration capacity of 9,949 B.t.u. per hour. Model 50 uses the same cabinet, but is equipped with a 1-hp. motor. Fan equipment is also similar to Model 40's. Refrigeration capacity of the unit is 12,980 B.t.u. per hour.

Airtemp Makes Big Installation in New Auto Showroom

NEW YORK CITY—Air conditioning America's newest automobile showroom, an installation composed of four separate systems, totaling 80 tons of refrigeration—the largest ever installed for such a purpose—was put into operation with the recent opening of the Chrysler International Automobile Salon in the Chrysler Building.

Three direct expansion Freon systems and one indirect chilled water system perform the cooling. Air is then centrally circulated about the salon through ducts.

Equipment was installed to cool over 5,000 sq. ft. of space on the first floor of the skyscraper and approximately 15,000 sq. ft. of space on the second floor.

First floor and three offices of the second are cooled by a 40-ton installation of compressors located in a machine room on the third floor. This unit, a direct expansion Freon system, has a capacity of 15,000 c.f.m. and circulates the air with a fan powered by a 7 1/2-hp. motor. Total space covered by the system is 7,400 sq. ft. with a cubic air content of 96,400 ft. A complete change of air is provided in this section every 6 1/2 minutes.

Conditioning the air in the remainder of the second floor display room are two 15-ton direct expansion units, located in the northeast and west corner of the second floor. The first unit has a 2-hp. fan, and the second a 3-hp. fan. Together they have a capacity of 10,800 c.f.m. Cubic content of the space conditioned by these units is 117,400 ft., and change of air is provided every 10 1/2 minutes.

10-Ton Unit Conditions Movie

Cooling a motion picture display room on the second floor which has a cubical content of 16,200 ft. and seating capacity for 150 people, a 10-ton compressor is installed on the third floor. This is a chilled water installation. A 1 1/2-hp. fan circulates air from this unit at a rate of 3,000 c.f.m., and air change is provided every 5 1/2 minutes.

All four of the systems are coordinated and controlled by a master-submaster unit which automatically regulates cooling in accordance with outside temperature conditions. Complete duct work for the installation is acoustically treated with felt lining to eliminate noise.

Installed to serve as a commercial display for Airtemp, Inc., subsidiary of the Chrysler Corp., one of the 15-ton units on the second floor has been set into a glass enclosed partition, so that visitors may see it in operation.

Other features of the showroom include a revolving floor for the display of cars, scientifically designed display lighting, and what is said to be the world's largest installation of invisible-glass windows, curved so that light reflection is eliminated.

Fibre Products Adds 3 New Buildings

CORNING, N. Y.—Increased production demands of Fibre Products Division of the Corning Glass Works has necessitated construction of three new buildings, according to Leslie W. Morrow, recently appointed general manager of the division.

The first of the new units will increase storage and shipping facilities, the second will provide additional manufacturing space, and the third will accommodate construction of an additional glass melting furnace.

The new glass fibre produced by this company is used principally for building insulation, refrigerator linings, and air-conditioning filters.

G-E Markets New Gas-Fired Winter Air Conditioner

BLOOMFIELD, N. J.—A gas-fired warm air conditioner, developed especially for winter residential service, has been introduced by General Electric Co. Although the conditioner is directly fired, cooling coils for complete summer air conditioning may be added.

The one-piece cast iron heating unit eliminates possibility of flue gas leaks, and electric pilot switches prevent opening of the main gas valve until all pilots are burning. Fully automatic humidity control and thermostat enable the mechanism to function steadily without attention.

Use of the aphonous radial flow fan secures the delivery of a large amount of air, against high pressure but with little noise. The heating surfaces include radiation screens of sheet steel with high heat transfer rate.

Penn Switch Appoints Cramer-Krasselt Co. as Advertising Agent

DES MOINES—Penn Electric Switch Co., manufacturer of automatic controls, has appointed The Cramer-Krasselt Co. of Milwaukee as its advertising and sales counsel.

This appointment is the first step of an extensive advertising and merchandising campaign which will include national advertising, trade paper advertising, and nation-wide sales meetings.

Aim of the campaign will be to sell the public automatic heating, and to convince them of the reliability of dealers in the industry, according to Nelson B. Delavan, Penn's vice president and director of sales.

In its trade paper advertising, and in sales promotional literature, efforts will be made to educate the salesmen and dealers in better methods of selling more automatic heating, rather than concentrating on products using Penn controls exclusively.

Young Radiator Co. Names Sommers Buffalo Outlet

BUFFALO—Young Radiator Co., Racine, Wis., announces appointment of W. J. Sommers as distributor for Young convection heaters, blast heaters, unit coolers, commercial heat transfer surfaces, and air-conditioning equipment in this territory.

Mr. Sommers has many contacts in upper New York state, having been located at Albany for many years.

Chicago Air-Conditioning Installations Total 246 1-2 Hp. in October

Name and Address of Customer	Class of Business	Tons	Hp.
Gievert Film Co., 140 E. Illinois	Industrial—Film Storage	1/2	1/2
Acme Steel Co., 2840 S. Archer	General Office	135	150
Stanis Co., 1307 Milwaukee	General Offices (5 units)	4 3/4	4 3/4
Wilson Bros., 528 S. LaSalle	General Office	0	5
Dr. M. H. Barker, 222 E. Illinois	Residence	1/2	1/2
Dr. Lewin, Standard Club	Residence (duct)	1 1/2	1 1/2
English Restaurant, 1103 Granville	Restaurant	5	5 1/2
Palmer Dress Shop, 56 W. Adams	Store—Dresses	0	6 1/2
Cinema Theater, 151 E. Chicago Ave.	Theater	30	30
Kamp, C & Son, 318 N. Central	Undertaker	25	30
Weinstein Bros., 1300 Devon	Undertaker	0	12 1/2
Total, 11 Installations		202 3/4	246 1/2

Airtemp's Operating Display Unit



Pat Tierney of Airtemp, Inc., shows Walter P. Chrysler, chairman of the board of Chrysler Corp., one of four units used to condition Chrysler's new International Automobile Salon in the Chrysler Bldg., New York City. This 15-ton unit operates behind glass as a display.

Air Conditioning Made Easy

By F. O. JORDAN

How Indirect Expansion Differs From Direct System

SECTION NO. 6

The Complete Air Conditioning System For the Cooling Season

Indirect Expansion System

OPERATION—The refrigeration equipment in connection with the indirect system operates similarly to the refrigeration equipment described above under "Direct Expansion" system, except that the liquid refrigerant is evaporated in the direct expansion water cooling coil (No. 12 in Fig. 2), instead of being evaporated in a direct expansion air-conditioning coil.

Balancing or Selection of Equipment—The heat flow in the indirect system is always from higher temperature level to lower temperature level, as in the direct expansion system. Heat flows from the air to the coil because the temperature level of the water which is being circulated through the coil is lower than that of the air.

The heat is passed on from the water in the cooling tank to the refrigerant in the direct expansion coil because the evaporative action of the refrigerant within the coil has reduced its temperature level below that of the water. The heat flows from the refrigerant within the condenser to the condensing water because the compressive action of the compressor has raised the temperature

level of the refrigerant above the temperature of the condensing water.

The inherent balancing propensities of the various units of the system, and their influence upon the conditions maintained upon equipment selection, are in general, as described under "Direct Expansion System." The addition of the water-circulating system adds one more step to be taken into consideration, but the sequence of balances may be followed through in the same manner.

Controls—With this system the control of the refrigerant system is similar to the control of the direct-expansion system, except that the liquid line solenoid valve is operated by the water temperature controller instead of room thermostat.

The room thermostat (No. 1) throws the water-circulating pump (No. 9) into operation when the room temperature rises above the setting of the thermostat. This water is drawn from the cold water storage tank or heat exchanger (No. 11) and is circulated through the air-conditioning coil (No. 2) where the water is warmed and the air is cooled and dehumidified.

From the air-conditioning coil, the warmed water is returned to the cold

water storage. As soon as the return of the warmed circulating water raises the temperature of the water in the tank or heat exchanger above the setting of the water temperature regulator (No. 16), the regulator closes the control circuit to the liquid line solenoid valve (No. 15), opening the valve and allowing liquid refrigerant to be fed from the condenser-receiver (No. 20) through the expansion valves (No. 13) into the direct-expansion water-cooling coils (No. 12).

The resulting rise of the suction pressure starts the compressor through the action of the pressure control, all as described under the description of the Direct Expansion System. The setting, functioning and installation of the thermostatic expansion valve and other controls is similar to the setting, functioning, and installation of the controls for the direct expansion system.

The water temperature regulator (No. 16) should be set to cut in at the maximum allowable water temperature from the water cooler and the bulb should be located near the surface of the water at such a point that it will be influenced by neither the temperature of the shell of the tank nor by the temperature of the direct-expansion coil.

Utilizing Heat of Fusion

Obviously the refrigeration storage capacity of a given tank will be greatly increased if the water which it contains is allowed to freeze, since the latent heat of fusion is made available as the ice is melted. It is of course necessary to limit the freezing action in order to prevent bursting the tank. This may be accomplished by properly locating the sensitive bulb of the temperature regulator in such a position that ice formation will reach the bulb before it reaches the shell of the tank, and setting the temperature controller to cut off at 31° F.

As soon as the ice formation reaches the bulb, the rate of heat transmission from the bulb becomes much more rapid which quickly lowers the bulb temperature below 31° F. so that the liquid line solenoid valve is closed, stopping the compressor through the action of the pressure controller.

Proper Placement of Bulb

If the space between the tank shell and the direct expansion coil is 6 inches, the bulb should be placed 4 inches from the coil, and if attached to the coil, should be attached by means of some material which does not conduct heat readily. To obtain proper results, the refrigerant temperature within the coil should be carried at about 20° to 25° F.

By using this method of refrigeration storage on a project of very high but short and infrequent peaks, it is possible to obtain sufficient storage capacity within a limited space to carry over the peak, yet make use of a condensing unit whose hourly capacity is much below the peak hourly load for 24 hours.

Historic Naval Ship 'Constitution' Gets Air Conditioning

BOSTON—Gun and berth decks of the U. S. Frigate *Constitution*, reconstructed shrine of American naval glory, have been protected against the destructive effects of time and weather by the installation of Carrier air-conditioning equipment. The equipment was operated for the first time on Armistice day, Nov. 11.

Many of the original timbers used in "Old Ironsides," as the vessel is familiarly called, deteriorated, necessitating their renewal. Careful search was conducted to find the desired replacement wood of proper quality and seasoning. The yellow pine was originally obtained in South Carolina and Georgia; Abington and the Merrimac Valley, Mass., and the Kennebec Valley, Me., provided the white oak used.

During the winter, both gun and berth decks are heated for the comfort of the thousands of visitors to this oldest ship in the U. S. Navy. Installation of a simple heating system, however, tended to reduce the air's relative humidity and dry out the timbers in the old ship, resulting in abnormal shrinkage and checkage.

Engineers at the Boston Navy Yard and engineers from the air-conditioning department of Carrier Corp., after studying the situation, evolved a system providing atmospheric conditions necessary to obviate this condition. The system circulates clean air, heated and humidified for comfort as well as for protection of the ship against the ravages of time and weather.

The Buyer's Guide

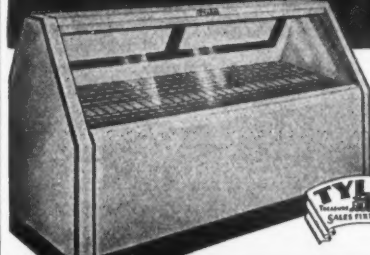
Suppliers Specializing in Service to the Refrigeration and Air Conditioning Industries



MANUFACTURERS

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TYLER'S NEW WELDED STEEL REFRIGERATOR CASES



At last a general purpose case at a sensible price. Offers every advantage of the most costly cases at tremendous savings. Modern in every detail. Comes equipped with coils. Single and double duty models.

AN AMAZING VALUE

Hundreds in use. Perfect refrigeration for meat, dairy and delicatessen products and all perishables sold in food stores. Write or wire for all the facts.

TYLER Sales-Fixture CO. Dept. E, Niles, Mich.

3 INCH INSULATION-TRIPLE GLASS

The CHOICE of SERVICE MEN

IMPERIAL SERVICE TOOLS

THIS popular line fully meets the demand for higher speed and accuracy required in modern servicing. A well known example is shown on the right. Other sizes for larger tubing.

Order from your jobber. Write also for new catalog 77-E

IMPERIAL BRASS MFG. CO.
565 S. Racine Ave. CHICAGO

Imperial Junior Tube Cutter

Takes all sizes of tubing from 3/16" to 3/4" O.D.
NO. 127-F
\$1.25



A clean, quick right-angle cut without flattening tube. Fits easily into palm of hand.

Diagram of Indirect Expansion System

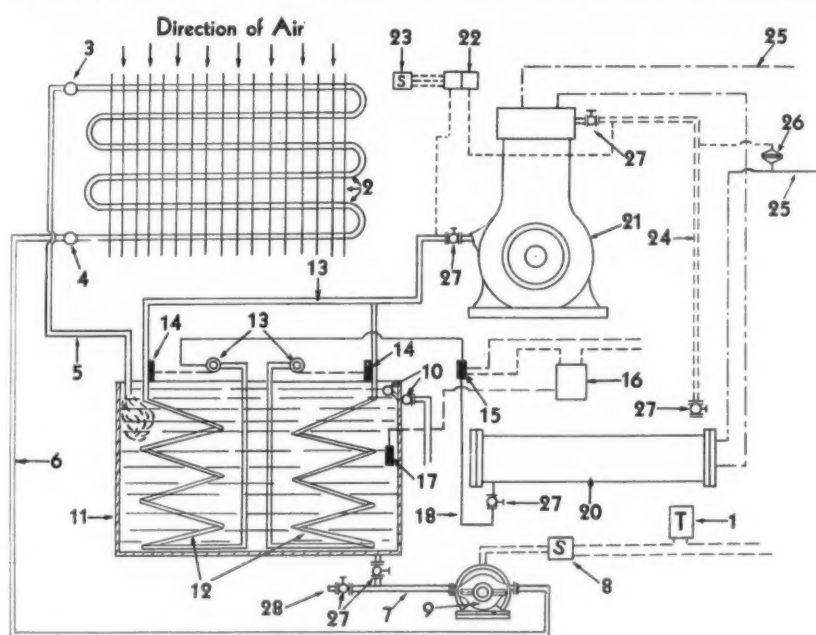


Fig. 2—Diagram of Condensing unit for indirect expansion system of air conditioning. Key to numbered parts follows:

1. Room Thermostat—Set at desired room temperature.
2. Air-Conditioning Coil—Select on basis of total capacity, and ratio of latent-to-total capacity from Tables in Data Section.
3. Return Header—Must have ample size for good distribution.
4. Supply Header—Must have ample size for good distribution.
5. Water Return.
6. Water-Circulating Pump Discharge.
7. Water-Circulating Pump Section—Base all water line sizes on low friction drop.
8. Water-Circulating Pump Starter—Controlled by room-thermostat.
9. Water-Circulating Pump—Must circulate sufficient water through air-conditioning coil to develop necessary capacity against friction of system.
10. Float Valve for Make-up Water.
11. Cooling Tank or Heat Exchanger—Size per ton refrigerating capacity depends upon length and frequency of peak period.
12. Direct-Expansion Water-Cooling Coils—See Data Section.
13. Thermostatic Expansion Valves—Set for about 18° swing.
14. Sensitive Bulbs of Thermostatic Expansion Valves—Clamp in intimate contact with suction lines.
15. Liquid Line Solenoid Valve—

Operated by water temperature regulator.

16. Water Temperature Regulator—Set for desired water temperature. If ice is desired, set below 32°. When ice builds out to bulb, the control will shut off supply of liquid refrigerant.

17. Sensitive Bulb of Water Temperature Regulator—If bulb is attached to coil, a non-heat conducting material must be used for attaching.

18. Liquid Refrigerant Line—See Data Section for Size.

19. Refrigerant Suction Line—Low Pressure Gas. See Data Section for size.

20. Condenser.

21. Compressor.

22. Pressure Control—Set high pressure element to stop compressor at 180 lbs. (for Freon). Set low pressure element to cut out at 5 to 10 pounds and cut in at 25 to 30 pounds.

23. Compressor Motor Starter—Operated by pressure control.

24. Compressor Discharge Line—High Pressure Gas.

25. Condensing Water-Circulating Lines.

26. Head Pressure Control—Set at head pressure given in Condensing Unit Performance Tables in Data Section.

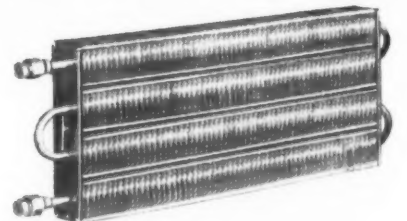
27. Service Valves.

28. Drain.

FINNED EVAPORATOR AND CONDENSER COILS

FINNED COILS
FOR
ALL PURPOSES
STEEL—COPPER—
ALUMINUM AND
SPECIAL METALS

Positive thermal bond between metals of proper thickness to assure maximum heat transfer.



JACKSON ACME INDUSTRIES Inc. MICHIGAN

AND NOW—A 45 Cu. Ft. Refrigerator
The 650—Companion to the popular 350 Model

A six-door Refrigerator, with storage capacity of 45 cu. ft. Equipped with solid or glass display doors in top section. 3" approved insulation, re-tinned steel shelves, extra heavy chromium hardware, and choice of DuLux or Porcelain finish.

Sufficient shelf space in 3 lower compartments for 21 cases of beverage, and enough height on top shelf to accommodate 24 oz. bottles. Greater Capacity, yet it occupies but 13 3/4 sq. ft. of floor space.

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Replacement Capacitors

Exactly matching original equipment of all popular makes of capacitor-starting motors. All types. All capacities. Electrolytic and oil-filled units. • Just the thing for electric refrigerator servicing. • Write for bulletin listing refrigerator motors and their capacitor requirements.

AEROVOX CORPORATION

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Brooklyn, N. Y.



AEROVOX

Manufacturers and Jobbers Exhibit Replacement Parts at Memphis Show



Skinner Chuck Co. displayed a complete size range of its piston rings designed exclusively for refrigeration use.

Rotary Seal Co.'s exhibit was built around a model designed to show the flexibility of the company's model KF 1505 seal.

Standard Refrigeration Parts Co. displayed its replacement valves, evaporators, controls, American Injector products, Ansul refrigerants.

Classified

RATES: Fifty words or less, one insertion, \$2.00, additional words four cents each. Three insertions \$5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Air Conditioning and Refrigeration News, 5229 Cass Ave., Detroit, Mich.

POSITIONS AVAILABLE

ENGINEER—experienced in development, design and application of household electric refrigerating units. Must know production methods. Must be thoroughly experienced in design and construction of hermetic motor-compressor refrigerating units. Box 870, Air Conditioning and Refrigeration News.

COMMERCIAL REFRIGERATION and air conditioning sales engineers. To estimate and work up proposals for salesmen. Mostly inside work. Salary and overtime on sales. Men with Kelvinator experience given preference. Good opportunity to make real money. Apply by mail, giving detailed information. PITTSBURGH REFRIGERATION CO., 1115 Penn Ave., Pittsburgh, Pa.

OPPORTUNITIES OPEN for several experienced retail salesmen with dealers in central Florida selling Westinghouse refrigerators, ranges, radios, etc. on commission. A good year-round territory; dependable salesmen can make good money. Married men preferred, should have sufficient funds to finance self for sixty days. Write P. O. Box 330, Orlando, Fla.

POSITIONS WANTED

THE SERVICES are available of an outstanding merchandiser of gas and electric household appliances, now employed as sales manager for one of the most successful wholesale distributors of such products. Will consider an association with a manufacturer or distributor of major appliances located anywhere. If interested in personal interview address Box 872, Air Conditioning and Refrigeration News.

FRANCHISE WANTED

AMERICAN parts manufacturers desiring Canadian representation to refrigerator manufacturers, jobbers and distributors should consult us. We specialize in refrigeration supplies exclusively. References: Bank of Montreal, Monkland branch, and National Jobbers Association. Factory representatives for Cutler-Hammer, Ranco, Rotary Seal, Address: MODERN HOUSEHOLD APPLIANCES, LTD., 1106 Beaver Hall Hill, Montreal, Canada.

EQUIPMENT WANTED

WE WILL PURCHASE for cash any quantity of refrigerators, parts, motors and accessories, of any type or description. References: National City Bank, Gramercy Park Branch, or Dun-Bradstreet. FEDERAL REFRIGERATOR CORP., 57 E. 25th St., New York City.

REPAIR SERVICE

GENERAL ELECTRIC and Majestic hermetically sealed units repaired and exchanged. Guaranteed work. Wholesale only. Give model when writing. All prices quoted f.o.b. Chicago. AMERICAN REFRIGERATING ENGINEERS, INC., 2257 Silverton Drive, Chicago, Illinois.

REFRIGERATION CONTROLS, domestic types, repaired. Ranco pencil types \$1.75, all box types, \$2.00. Majestic \$2.50. UNITED GAUGE AND INSTRUMENT COMPANY, 436 West 57th Street, New York City.

MAJESTIC & GRIGSBY-GRUNOW original and genuine factory refrigerator and radio service. All parts, service replacement units will carry regular factory six-month guarantee. Buy only through our authorized distributors, dealers or ourselves. Complete stock Majestic radio parts and tubes. Write for particulars. GRIGSBY-GRUNOW COMPANY, 5801 Dickens Ave., Chicago, Ill.

SCHOOLS

REFRIGERATION AND AIR CONDITIONING is easiest to understand and explain when we have a clear understanding of the fundamentals. Our extension course is especially practical for executives and others in refrigeration and air conditioning who lack the technical training. Detroit School of Refrigeration and Air Conditioning, 4125 Grand River, Detroit.

Patents

Issued October 20, 1936

2,057,666. REFRIGERATING COOLING UNIT. Russell H. Bird, Detroit, Mich. Application Feb. 13, 1935. Serial No. 6,329. 5 Claims. (Cl. 62-101)

2,057,727. AIR CONDITIONING APPARATUS. William H. Leinweber, Chicago, Ill. Application March 1, 1935. Serial No. 8,837. 5 Claims. (Cl. 261-11)

2,057,746. REFRIGERATING APPARATUS. Edmund F. Schweller, Dayton, Ohio, assignor, by mesne assignments, to General Motors Corp. Application July 3, 1931. Serial No. 548,583. 16 Claims. (Cl. 220-9)

2,057,938. REGENERATIVE AIR CONDITIONING SYSTEM. Robert B. P. Crawford, Brooklyn, N. Y. Application Feb. 23, 1932. Serial No. 594,754. 69 Claims. (Cl. 62-171)

2,058,002. REFRIGERATOR TRAY. Charles Daum, Forest Hills, N. Y. Application Feb. 6, 1935. Serial No. 5,177. 3 Claims. (Cl. 211-77)

2,058,022. HEAT EXCHANGER. Albert Francois Lebre, Paris, France. Application May 5, 1934. Serial No. 724,045. In France May 20, 1933. 15 Claims. (Cl. 257-245)

2,058,042. AIR COOLING AND CONDITIONING APPARATUS AND SYSTEM. Bennet Carroll Shipman, San Mateo, Calif., assignor to Servel, Inc., New York, N. Y. Application Nov. 7, 1932. Serial No. 641,591. 12 Claims. (Cl. 62-171)

2,058,077. REFRIGERATOR. Harold A. Greenwald, Los Angeles, Calif. Referred for abandoned application, Serial No. 569,241, Oct. 16, 1931. This application Jan. 31, 1936. Serial No. 61,733. 36 Claims. (Cl. 62-108.5)

2,058,098. COOLING AND DISPENSING SYSTEM. Charles S. O'Neil and Elmer M. Wachtel, Two Rivers, Wis., assignors to Hamilton Mfg. Co., Two Rivers, Wis. Application April 23, 1934. Serial No. 721,849. 14 Claims. (Cl. 62-141)

2,058,226. ICE TRAY FOR REFRIGERATORS. Robert Lay Hallock, Larchmont, N. Y. Original application May 28, 1932. Serial No. 614,091. Divided and this application June 7, 1935. Serial No. 25,364. 6 Claims. (Cl. 62-108.5)

PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. VAN DEVENTER (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

Adkins Represents Melchior Armstrong in Italy

NEW YORK CITY—D. L. Adkins, who joined the domestic sales force of Melchior, Armstrong, Dessau Co. about a year ago, has been appointed sales representative of the company in Great Britain, with headquarters in London.

Prior to joining Melco, Mr. Adkins was for several years secretary and treasurer of Servel, and manager of the company's New York City branch.

Harry G. Noordberg, sales director of Melco for France, Holland, and Belgium, has just returned to his permanent headquarters in Amsterdam after several weeks spent in visiting various refrigeration and air-conditioning equipment manufacturers to see the latest developments in the industry at first hand.

Federal Trade Commission Orders Utilities Engineering Institute Not to Advertise Its Course Under 'Help Wanted' Classification

WASHINGTON, D. C.—The Federal Trade Commission has directed the Utilities Engineering Institute of Chicago to discontinue advertisements of its correspondence courses on refrigeration and air conditioning in "Help Wanted" columns of newspapers, and to cease any other promotion practices that might mislead readers into believing that a direct tie-up existed between the school and various firms which could provide for immediate employment on completion of the training.

In its order in the matter of Utilities Engineering Institute the Federal

Trade Commission made the following stipulations:

(1) From representing, directly or indirectly, through advertisements in classified advertising pages of newspapers, magazines, or other advertising literature, under such headings as "Wanted," "Help Wanted," "Male Help Wanted," "Young Men Wanted," or headings of similar import and effect, or through the use of any other means, that respondent has positions or jobs at its disposal or that employment is being or will be offered to persons who answer said advertisements, when said advertisements are in reality contact advertisements used in connection with the sale of courses of instruction:

(2) From the use of any word or words employed as a heading, title, or otherwise in newspaper advertising or other advertising media which have the capacity, tendency, and effect of confusing, misleading, or deceiving the reader of such advertisement in relation to the fact that a correspondence course of instruction in air conditioning and electric refrigeration is being offered for sale:

(3) From representing, directly or indirectly, that so-called "Job Tickets" will be furnished applicants or students, after a short time, whereby they can earn money while training, through the installation and servicing of electric ice boxes:

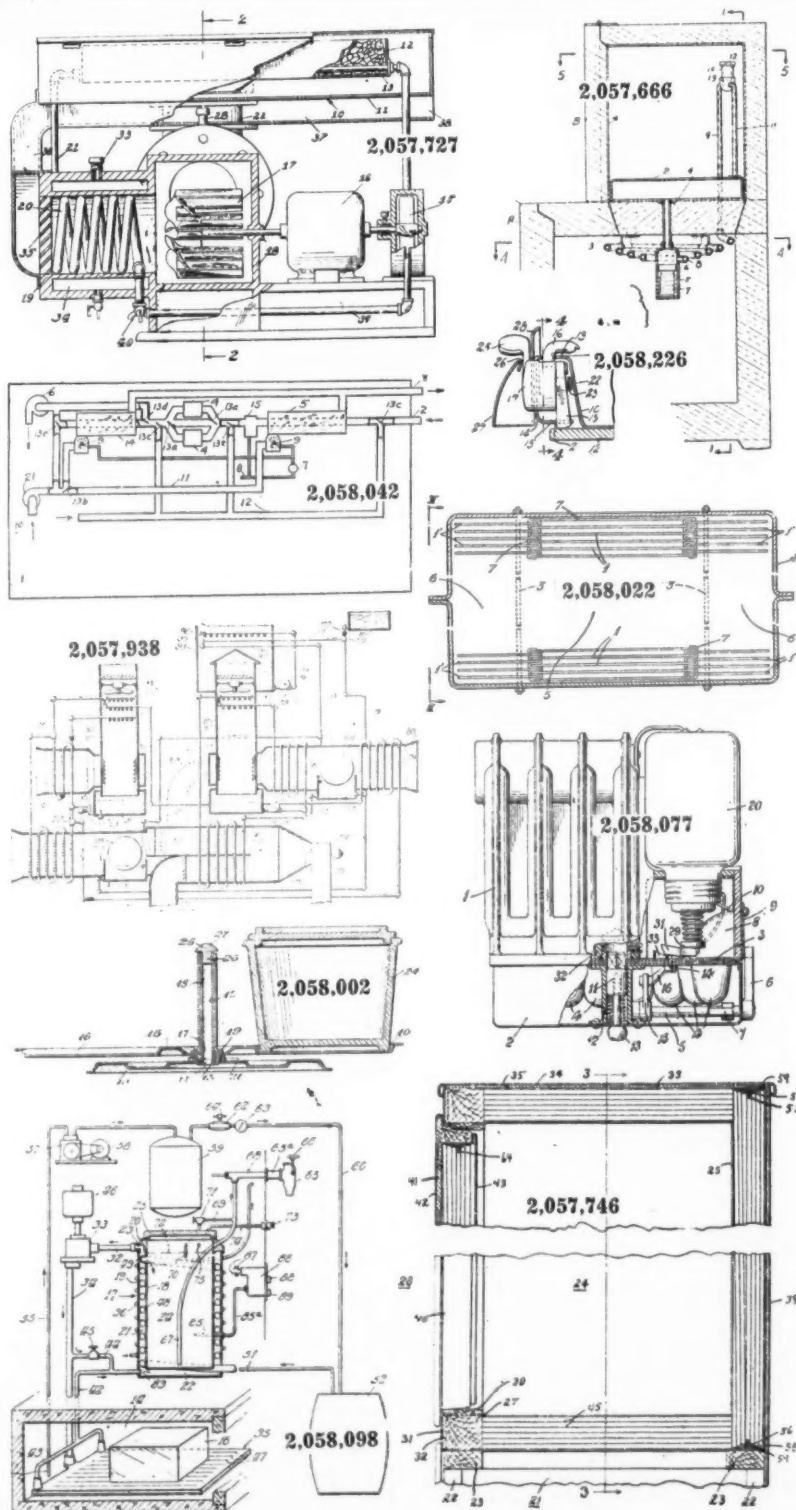
(4) From representing, directly or indirectly, that respondent has made arrangements with various firms, by which said firms will employ students who have concluded any course of instruction sold by it, and give them permanent positions, or that respondent will do so.

In its reply to the Commission's charges, the Utilities Engineering Institute maintained that all its classified advertisements have been ordered with specific instructions to classify them under the "Trade Schools" or "Male Instructions" columns, but that certain newspapers ignored these instructions and inserted the advertisements in "Help Wanted" columns.

Utilities Engineering Institute points out that on the form by which the school orders its advertising, there is a notice published in large type that the advertising be classified under "Male Instruction," with the stipulation that it shall not be classified under "Help Wanted."

Utilities Engineering Institute has now drawn up a revised advertising form in which demand is made for a refund in case the advertisement is placed under improper classification. Papers which persist in defying instructions will not be used.

Reference to so-called "Job Tickets," says the Institute, is in regard to a supplementary service furnished students, but discontinued under that name approximately one year ago. It was a plan which the Institute devised to help students form the nuclei of permanent businesses as independent service stations, but the word "Job" in the title "Job Tickets" seemed to cause confusion, as students would sometimes infer that it meant the Institute would furnish them with specific jobs to be done. This name was changed to "Service Guides" and misunderstanding eliminated.



COMMERCIAL Service Manual

By K. M. NEWCUM

Types of Condenser-Receiver Used in Water-Cooler Units

CHAPTER 6—Commercial Condensing Units—Continued

Double-Tube Condensers

Commercial condensing units from 1/2 hp. up are manufactured using a water-cooled condenser which, as the name suggests, uses water as the condensing medium.

The double-tube or tube-within-a-tube condenser as shown in Fig. 72, a Universal Cooler condensing unit, is a very simple yet very efficient type of water-cooled condenser.

The condenser is made of two copper tubes one inside the other. On certain models, Universal Cooler uses 7/16-inch OD copper tubing on the inside and 3/4-inch OD tubing on the outside.

Connection of Tubes

The inside tube by means of a special fitting is extended to the outside on the Universal Cooler unit shown in Fig. 72. This top or outlet connection is on the top of the compressor. The outside tube is connected to the discharge shut-off service valve.

With this arrangement the hot

ing through this inside tube from the bottom to the top, and out to the drain.

Hot gas is being forced through between the cold inside tube and the outside tube from the top of the condenser downward.

As the hot gas comes in contact with the cold wall of the inside tube, condensation takes place and the liquid thus formed trickles down into the liquid receiver.

By having the gas tube on the outside of the water tube, the condensing or cooling effect of the surrounding air is utilized in addition to the condensing water.

Water-Cooled Condenser-Receiver

A water-cooled condenser-receiver is one in which the water coil is built into the receiver which acts as a combination condenser and liquid receiver.

The receiver proper is usually fabricated the same as those used with the air-cooled or double-tube condenser, except that the water coil is built in, with an inlet and outlet water connection provided.

Shell-and-Tube Receiver

Fig. 73 shows a cut-away view of a Frigidaire condenser-receiver of the so-called shell-and-tube type.

Note that the water coil is supported on a framework to hold it rigid and also keep it in place so as to provide good distribution. With this design the cooling water is circulated through the copper coil while the gas and liquid are contained in the shell.

Shell-and-Tube Type

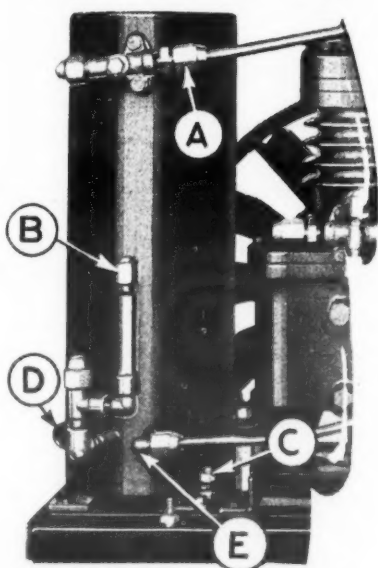


Fig. 74—Shell-and-tube condenser-receiver shown with all connections made.

Double-Tube Condensers

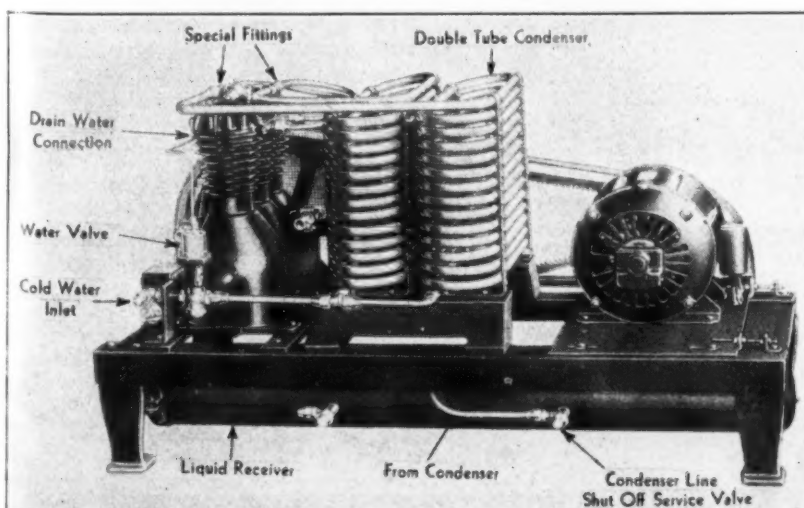


Fig. 72—This Universal Cooler condensing unit employs a double-tube water-cooled condenser. The principal parts are shown by arrows.

Newer Model



Fig. 75—Later type Frigidaire condenser-receiver.

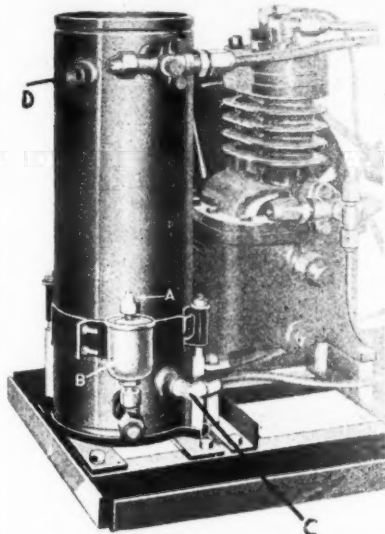


Fig. 76—Frigidaire condenser-receiver with new-type filter shown at A.

The water enters the coil from the water valve through connection "D" (Fig. 73) and circulates through the coil to outlet "C" which is piped to a drain.

The hot gas from the compressor enters the shell through valve "A" and comes in contact with the cold walls of the water coil where it condenses and drops to the bottom of the receiver to be fed to the evaporators through valve "B."

Fig. 74 shows a condenser-receiver of this type with all connections made. The water enters through connection "E" and exits through outlet "D." The hot gas from the compressor goes into the condenser through discharge service shut-off valve "A." "B" is the liquid line connection.

A shell-and-tube type condenser may be either horizontal or vertical.

Location of Condensing Unit

With a shell-and-tube type condenser-receiver, where water is forever present inside the water coil which is inside the refrigerant circuit, the location of the condensing unit is most important, particularly where temperatures below freezing might exist.

If the water coil should freeze and burst, water or ice would be liberated to the refrigerant circuit.

This has been known to happen during extremely cold weather in unheated locations. When it does happen, the water usually circulates through the entire system. It is advisable, when such a condition exists, to remove the entire system to the shop for a complete overhauling and dehydrating where the receiver is either repaired or replaced.

All of the refrigerant lines, valves, etc. should be removed and new lines installed, for large quantities of water may be present in these lines.

Freezing may, of course, be prevented by heating the space around the condensing unit, or if it is possible to shut the system down, the water coil can be drained to prevent its bursting.

In draining the water coil, both the inlet and outlet connections should be removed and all water forced out of the coil with an air pump.

Fig. 75 shows a cut-away view of a later type Frigidaire condenser-receiver. With this design the hot gas enters the inside of the receiver through inlet "B." The liquid line shut-off service valve is connected to connection "A." The condensing water is admitted through inlet "C" (Fig. 76) and circulates between the inner shell in which is formed a spiral groove and the outer shell to outlet "D" (Fig. 76).

The water traveling in these convolutions between the shells cools the walls of the inner shell which effects

Horizontal Condenser-Receiver

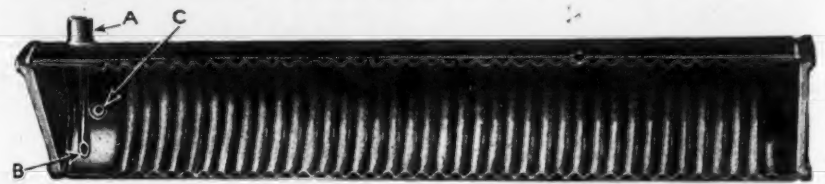


Fig. 77—This Frigidaire condenser is very similar to that shown in Figs. 75 and 76, except for its horizontal position.

condensation when the hot gases come in contact with this cold surface.

A horizontal condenser-receiver of the same type is shown in Fig. 77. The hot gases enter through inlet "C" and the liquid refrigerant is fed up through the liquid tube "B" to connection "A."

Bursting from freezing with this type of condenser-receiver is not as common, as the outer shell provides more room for expansion; however, the same general rules to prevent this condition should be followed.

Crosley Places \$100,000 Tool & Die Order for 1937 Models

CINCINNATI—Order for tools and dies to be used in manufacturing the parts for next year's line of Crosley household electric refrigerators has been placed with D. L. Auld Co., Columbus, according to Lewis M. Crosley, vice president and general manager of Crosley Radio Corp.

Amount of the order is estimated at approximately \$100,000.

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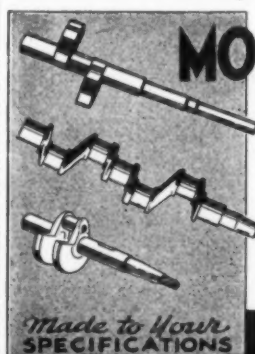
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